

ADDITIONAL NOTES ON THE GENUS VERBENA. XXVI

Harold N. Moldenke

VERBENA OFFICINALIS L.

Additional bibliography: Sweet, Hort. Brit., ed. 1, 1: 325 (1826) and ed. 3, 553, 1839; Moldenke, Phytologia 36: 221, 235, & 247--250. 1977.

Additional vernacular names reported for this species are "ërbo dé mèrvèyo", "ërbo dé Nouéstro-Damo", "erculania", "erva de la mivuzà" [-jaundice-herb], "escalaurus", "eseberus", "exuperans", "exupra matricalis", "eyenchrawl", "ferria", "flegwurt", "fleur de madame", "gerabotann", "gerobotanis", "grünkraut", "hardiizer", "herba sagminalis", "herba sancti Johannis", "herba sanguinalis", "herba verminata", "herbe à la croix", "herbe à tous maux", "herbe au chat", "herbe de l'effort", "herbena", "herculana", "hiera", "hierobotann", "hraetelwyr", "iiserhard", "iiserkruid", "isanina", "isarna", "iserenhard", "isinina", "isnwurze", "Juno's teares", "kerckkruid", "kroazik", "lanzaouem ar groaz [-herb of the cross], "lerepontrina", "lirobotann", "lustago", "menthe de chat", Mercurie's moistblood", "militaris", "morènò", "nymphaea", "palumbaris", "peltoclotis", "peltodotes", "pijounièro", "qanna-biyyé", "recia", "riz' el hhamân" [=pigeon's food], "sabiarella", "sacra frondis", "sacralis", "sacratimen", "sagmen"m "sagmina", "sanguinaria", "thiabsenti", "trixago", "varlenn", "varvan-na", "varvègne", "varvéna", "varvéns", "varvéno", "vèlvène", "vènééré", "vèrbèna", "verbana columbina", "verbena mascula", "verbena recta", "vèr bèn ày", "verbene", "verbien", "verbigena", "vèrlène", "vèrlin-ne", "vermaine", "vèrmèno", "vermina", "verminaca", "verminacia", "verminatio", "verpidion", "vertipedium", "vertipodum", "vertiroedum", "verveine droicte", "vèrvéle", "vèrvèlo", "vervenn", "vervine", "vèrvin-ne", "vèrvouin-ne", "virvoni", "vorouéne", "vouorvéno", "vratour", "vrèvin-na", "werbinádj", "ysendeck", and "yzerne". Quite a few of these names go back to classical times and to the Middle Ages. This brings to 421 the number of vernacular names thus far listed by me for this plant.

Don (1830) calls V. officinalis the "official vervain", V. sororia the "sister vervain", and V. spuria the "spurious vervain" — the first of these he admits as native to England, the second he says was introduced into English gardens from Nepal in 1824, and the third as introduced from "N. Amer." in 1731. Sweet calls the same three taxa the "common", "sister", and "jagged-leaved" vervain and gives 1823 as the date of introduction of the second.

Rolland (1910) also tells us, quoting various (mostly old) authors, that "cette herbe sacrée était cueillie à Rome, sur le Capitole par les Féciaux. Celui qui la portait était appelé 'verbenarius'." Of the name, "fleur de madame", he notes that this is in contradistinction to "fleur de monsieur", which is applied to Sisymbrium officinale. He continues: "L'ërbo de la vèrmèno Fo coulá lou sanc

séns doubri la véno - la verveine fait couler le sang sans qu'on ouvre la veine....La verveine passe pour guérir nombre de maladies et en biens des endroits pour garantir des sorciers celui qui la porte sur soi. On emploie cette plante comme détersive, on dit qu'elle mang le sang....Prenez chaque matin, pendant neuf jours, un morceau de pain et une gousse d'ail; puis allez les déposer devant un pied de verveine. Cela fait vous aures soin d'uriner sur le tout; c'est un remède infailible contre les fièvres quartes.... Pisser sur la verveine porte bonheur....Pour morsure de serpent, ardez la vervainne et en faites poudresi la metez sur la morsure, si garira. Et qui portera la vervainne suz soy jamais serpent ne le grevera.....Les vieilles femmes vont chercher la verveine dont elles se serviront comme remède, au clair de la lune et en marchant à reculons....

"Le sorcier, qui veut savoir quelle maladie a celui qui vient le consulter, cueille, en décours de la lune, trois branches de verveine qu'il laisse macérer pendant trois jours et troi mits dans du vinaigre. Au lever de la lune, il reconnaît, à la manière dont les feuilles sont antrelacées, de quelle maladie son client est atteint....Sur les vertus médicinales de la verveine, voyez encore: 'Dialogue des créatures' (1482)....Pour n'estre point las en allant, prens verveine cueillie la veille de la Saint-Jehan et la porte sur toy....Pour qu'un cheval ne se lasse pas en courant attachez lui la grosse dent du loup en marchant et pendez lui au cou des racines de verveine et d'armoise....Pour escalader facilement les montagnes, les armaillis et surtout les garçons de chalet mettent à leur jarretière un rameau de verveine qu'ils appellent 'vérvéna à corre' - verveine à courir....Pour faire dix lieues à l'heure vous appliquez sur la rate un emplâtre composé de divers ingrédients parmi lesquels sept feuille de verveine.....

"La verveine donne de la force aux lutteurs....Au Sabbat les diabolins se font des jarretières de verveine pour marcher sans fatigue....Pour que les pomniers produisent beaucoup, on met un brin de verveine dans les branches....Si on fromme les poules avec de la verveine sauvage, on est assuré de les vendre un bon prix... La femme qui a perdu son lait, doit, pour le recouvrer, cueillir trois soumités de branches de verveine, en récitant le 'Pater noster' et l'Ave Marie' et les porter sur soi....."un brin de verveine porté constamment sur soi, rend chaste....Cueillie et brûlée le jour de la Saint-Jean la v.guérît les gornies. Nos paysans disent ironiquement que, dans sa cendre, se trouve le 'gekkensteen' (=pierre des fous).....

"Les femmes blanches, apparitions nocturnes, présentent aux personnes qu'elles rencontrent une branche de chêne ou d'herbe de la croix (verveine). Si l'on accepte ce talisman, on sera doué d'autant d'années de puissance et de joie que la branche a de feuilles; mais au bout de ce temps, votre âme appartiendra au démon...Quand on veut acquérir l'affection d'une personne, on lui présente de la verveine.....

"Conjuration pour se faire aimer. Il faut par trois vendredis à huit heures du matin faire autour d'une verveine trois tours à rebours et bénédiction de la main gauche; et le dernier vendredi

l'arracher de la main gauche et en la cueillant il faut dire ces mots: 'o pega vervena, o pega, o pega, Lucia vervena, Lucia vervena, Lucia, o Luna, Luna'. Puis il faut faire poudre de cette verveine, en disant: 'Je te conjure aux noms de Vénus et de Cupidon, du Soleil et de la Lune que celle de toi je toucherai ne puisse nul autre aimer que moi et m'aime comme toi même'. Puis en touchant la fille, dites: 'Audi filia (ici le nom de la fille) et inclina aurem tuam et obliviscere populum tuum et domum patris tui et sequere me'.....

"Autre incantation pour se faire aimer: Le premier vendredi de la nouvelle lune, il faut avoir un couteau neuf et aller cueillir une verveine. Il faut se mettre à genoux, la face tournée vers le soleil levant et, coupant la date herbe avec le couteau, dire: 'Sara isquina safos; je te cueille, herbe puissante, afin que tu me serves à ce que je voudray'. Puis vous vous léverez sans regarder derrière vous. Étant dans votre chambre vous la ferez sécher et pulvériser et vous ferez avaler cette poudre à la personne.....

"Autre incantation pour se aimer: Prenez de la verveine que vous pilerez et en frotterez le talon de votre main gauche, puis avec cette main, vous formerez un signe de croix à votre front, ensuite à celui de la fille, en disant: 'Cathos, que ton désir seconde au mien comme celui de Saint-Joseph avec Marie!'.....

"Le verveine prise le soleil étant en Aries, avec de la graine de pivoine d'un an, mises en poudre, si la poudre est mise entre deux amants, aussitôt ils auront querelle.....

"Language des fleurs. — La verveine signifie: ne me laissez pas pour une autre...Un brin de verveine sauvage, offert à une fille, équivant à une déclaration....La verveine symbolise les enchantements....La verveine symbolise l'inspiration, la poésie."

Gibbs (1974) reports cyanogenesis absent from the leaves and seeds of this species, leucoanthocyanin absent from the leaves, and syringin absent from the stems; in addition, the Ehrlich test gave negative results in the leaves.

Keys (1976) says that in China the leaves are used medicinally. The taste is bitter. The "Plant contains an essential oil (comprising citral, geraniol, limonene, verbenone), invertin, a bitter principle, verbenalol ($C_{11}H_{14}O_5$; long prismatic needles; m.p. 133°; soluble in ether, acetic acid; poorly soluble in water) and the glycoside verbenalin ($C_{17}H_{25}O_{10}$; bitter needles; m.p. 178°; freely soluble in water; slightly soluble in alcohol, acetone; insoluble in chloroform, ether). Verbenalin in frogs produces mucosal ex-coriation. Prescribed as emmenagogue. Dose, 19—18 gm."

Sutherland refers to *V. officinalis* as "frequent" on steep slopes in Ethiopia; the corollas are described as having been "purple" on his no. 309, "bluish-violet" on Westra & Rooden 189, and "blue" on Beach 5110. Beach describes the plant as "a vigorous much-branched weed". On Sebald 381 the corollas were "lilac" in color when fresh.

The Fitter work cited in the bibliography of this species is dated "1974", but was not actually issued until February 17, 1975.

It is also worth noting here that although Bock (1522) uses the name, Verbena foamina, in his text, his accompanying illustration very plainly is meant to depict V. officinalis.

Stokes (1812) gives some interesting sidelights about this species, telling us that Linnaeus believed the species "to have been wafted by the sea to Sweden". He quotes Miller as saying that it is "Never found above a quarter of a mile from a house". He states that Curtis, Lightfoot, and Scopoli classified it "after Mentha at the end of the order Gymnospermia of the class Didynamia, considering as a genus connecting the Personatae to the Verticillatae", while Hudson placed it "between Nepeta and Mentha, apparently regarding it with Ray as really belonging to the Verticillatae, in which disposition he has been followed by Walcott, Sibthorpe, and Smith....where it is acknowledged to be erroneously placed in the order Gymnospermia of the class Didynamia." He affirms that Ray described the corollas as pale-blue, while Bauhin called them pale-purplish. He goes on to say: "Root perennial according to Ray and Curtis, Sibth. Salisb. W. and Smith; biennial according to Huds, Hort. kew. and Donn; annual according to Boerh. Linn. and Lightf. Are we hence to conclude that it is sometimes perennial, sometimes biennial and sometimes annual, or to learn how little dependence in investigating plants is to be placed on the marks even of cultivating botanists, when we observe Curtis, Auton and Boerhaave holding opposite opinions?"

Loesener (1912) cites Seler 3460 from Atascosa County, Texas, as "V. officinalis L. forma?", but the plant represented is almost certainly V. halei. The Curtiss 677 and Rugel 121, cited below, were previously regarded by me as V. domingensis Urb., but I feel now that they are probably a form of V. officinalis (or even perhaps V. halei Small). This may prove true of most, if not all, of the Cuban material previously cited under V. domingensis, a species very likely endemic to Hispaniola.

The Herb. Zuccarini s.n. [Hort. bot. Monac.], cited below, is a mixture with xv. baileyana Moldenke. The Meebold 12840, distributed as V. officinalis, actually is V. brasiliensis Vell., McNeal 925 is V. californica Moldenke, Eggers 2175 is V. domingensis Urb., Karwinski s.n. is V. ehrenbergiana Schau., D. Dickinson s.n. [June 8, 1918], Lindheimer 1076 & s.n. [Galveston, May 1843], Pickett & Bot. Class 60, Thomas & Grenillion 2487, and Wurzlów s.n. [Sept. 15, 1917] are V. halei Small, Mukherjee s.n. [12.9.74] is xv. hybrida Voss, M. E. Jones 2215 is V. lasiostachys Link, Clemens 42170, Meebold 7818, 8304, & 12839, and Schlieben 7691 are V. litoralis H.B.K., Pringle 8534 is V. menthaefolia Benth., Repton 1298 is V. officinalis var. natalensis Hochst., J. Z. Weber 2294 is V. supina f. erecta Moldenke, and Robertson s.n. [June 5, 1899] is V. ruxta Lehm.

Additional citations: CUBA: Havana: Curtiss 677 (Ca, Es, Es, Mu,

N, Vt, W--522300). Matanzas: Rugel 121 [856] (C). CHILE: Valdivia: Hollermayer 607 (Mu). MACARONESIA: Gran Canaria: Kunkel 11247 (Mu), 11429 (Mu). GREAT BRITAIN: England: Harz 183 (Mu). SPAIN: J. Kraft JK.39 (Mu). GERMANY: Berger s.n. [München] (Mu--335); Brixle s.n. [Herb. Merxmüller 14339] (Mu); Herb. Mus. Bot. Landshuth s.n. (Mu--333); Herb. Schmiedel 93 (Mu--329), s.n. (Mu--328); Herb. Schreber s.n. [Marlofstein, 1784] (Mu--330); Herb. Univ. Maximil. s.n. (Mu--331); Herb. Zuccarini s.n. (Mu--338, Mu--339). ITALY: Gröbner s.n. [3.6.1968] (Mu); Zollitsch 4626 (Mu). MALTA: Westra & Rooden 189 (Ld). YUGOSLAVIA: Micevski 57110 (Mu). MOROCCO: Rauh 426 (Mu). ALGERIA: Doppelbaur 107 (Mu). EGYPT: Sisi s.n. [El Giza, 24.5.1973] (Mu). ETHIOPIA: Sebald 381 (Mu); Sutherland 309 (Ws). UNION OF SOCIALIST SOVIET REPUBLICS: Karachayeva-Cherkesskaya: Vekhor s.n. [Teberda, VII.1863] (Mu). Republic undetermined: Herb. Grimm s.n. [Novogorod] (Mu--344). IRAN: Redding 4 (M1). AFGHANISTAN: Beach 5110 (Ln--192056); Podlech 11391 (Mu), 18248 (Mu), 18654 (Mu), 19914 (Mu); K. H. Rechinger 19229 (Mu). PAKISTAN: Baluchistan: K. H. Rechinger 30270 (Mu). Northwestern Provinces: Brandis 1608 (Mu--1120). SIKKIM: J. D. Hooker s.n. [alt. 6000 ped.] (Mu--349). INDIA: Assam: Jenkins s.n. [Assam] (Mu--350); Watt 10362 (Mu). East Punjab: T. Thomson s.n. [alt. 1-4000 ped.] (Mu--348). Uttar Pradesh: Wallich 1825/4 (Mu--1264). State undetermined: Hügel s.n. [Mapuri, Ind. sup.] (Mu--353). BURMA: Upper Burma: Huk s.n. [Chin hills, June 1892] (Mu--3802); Luxburg s.n. [24.2.1903] (Mu). CHINA: Fukien: En 2022 (Mu), 2689 (Mu). FORMOSA: Tanaka & Shimada 11032 (Mu). THAILAND: Larsen & Larsen s.n. (Ac). JAPAN: Kyushu: Oldham 619 (Mu). AUSTRALIA: Queensland: M. S. Clemens 42796 (M1). CULTIVATED: Germany: Herb. Schreber s.n. [1789] (Mu--345); Herb. Zuccarini s.n. [Hort. bot. Monac.], in part (Mu). Mexico: Hendricks 590 (Ws). Sweden: Collector undetermined s.n. [20 Aug. 1835] (Ac).

VERBENA OFFICINALIS var. GAUDICHAUDII Briq.

Additional bibliography: Moldenke, *Phytologia* 28: 364 & 443 (1974) and 34: 602. 1976.

The Burke 55, previously cited by me as this variety, actually proves better regarded as representing var. natalensis Hochst.

Additional citations: AUSTRALIA: State undetermined: F. v. Mueller s.n. (Mu--1574).

VERBENA OFFICINALIS var. MACROSTACHYA (F. Muell.) Benth.

Additional bibliography: Moldenke, *Phytologia* 24: 27. 1972.

Additional citations: AUSTRALIA: Queensland: F. v. Mueller s.n. [Peake Downs] (Mu--1571--isotype, Z--photo of type).

VERBENA OFFICINALIS var. NATALENSIS Hochst. ex F. Krauss, Flora 28: 68, hyponym. 1845.

Bibliography: F. Krauss, Flora 28: 68. 1845; Moldenke, Résumé Suppl. 4: 17. 1962; Moldenke, Phytologia 10: 198 & 213. 1964; Moldenke, Fifth Summ. 2: 687. 1971; Moldenke, Phytologia 28: 364 (1974) and 34: 261, 262, & 279. 1976.

Although unaccompanied by a formal description, this variety is clearly based on Krauss 151 from "ad fluv. Umlaas, Natal, Dec." The unnumbered Krauss collection in the Munich herbarium is probably a part of the type collection.

Recent collectors speak of this plant as an erect perennial herb, 3 feet tall, and have found it growing in waste ground and "locally frequent" along old roads, at altitudes of 1300—1580 m., flowering in August, October, and December, and fruiting in August. The corollas are said to have been "purple" on Repton 1298, "mauve" on E. A. Robinson 5596, and "pale mauve" on Acocks 20990.

Material of this taxon has most generally been identified and distributed in herbaria as typical V. officinalis L. and many of the southern African specimens cited by me in previous installments of these notes may prove, on re-examination, to represent this variety. The Burke 55, cited below, was incorrectly cited by me in my 1974 work as var. gaudichaudii Briq.

Citations: ZAMBIA: E. A. Robinson 5596 (Mu). RHODESIA: Fries, Norlindh, & Weimarck 4002 (Mu); Morris 355 (Mu). SOUTH AFRICA: Cape Province: Krauss s.n. [-151?] (Mu—352—isotype?). Orange Free State: Acocks 20990 (Mu). Transvaal: Burke 55 (Pd); Repton 1298 (Z).

VERBENA OFFICINALIS var. PROSTRATA Gren. & Godr.

Additional bibliography: Moldenke, Phytologia 28: 362, 364, 392, & 427 (1974) and 34: 260. 1976.

Additional citations: GERMANY: Schultes s.n. (Mu—332). ETHIOPIA: Schimper 145 (Mu—347).

VERBENA OFFICINALI-VENOSA Paxt.

Additional bibliography: Moldenke, Phytologia 28: 364—365 & 464. 1974.

xVERBENA OKLAHOMENSIS Moldenke

Additional bibliography: Moldenke, Phytologia 28: 365 & 457. 1974.

VERBENA ORCUTTIANA Perry

Additional bibliography: Moldenke, Phytologia 28: 365. 1974.

Moran encountered this plant at 1500—1680 meters altitude, flowering and fruiting in July and August, referring to it as "common", "common in meadows and common for miles in open pine forests", and "common with Artemisia tridentata in openings in Jeffrey pine forests. He describes the corollas as "blue" on his nos. 16439 & 16479.

Additional citations: MEXICO: Baja California: R. V. Moran 16439 (Sd--71882), 16479 (Sd--71870), 18135 (Sd--76425).

VERBENA ORIGENES R. A. Phil.

Additional bibliography: Moldenke, *Phytologia* 30: 161. 1975.

Additional citations: CHILE: Coquimbo: Werdermann 225 (Mu).

VERBENA ORIGENES var. GLABRIFLORA Moldenke

Additional bibliography: Moldenke, *Phytologia* 24: 29. 1972.

Zöllner has found this plant growing at 4000 meters altitude, flowering and fruiting in January.

Additional citations: CHILE: Antofagasta: Zöllner 8309 (Ac).

xVERBENA OSTENI Moldenke

Additional bibliography: Moldenke, *Phytologia* 28: 365. 1974.

Recent collectors have encountered this plant "em afloramento rochoso", flowering in October and November. The corollas are described as having been "white" on both of the Brazilian collections cited below.

Additional citations: BRAZIL: Rio Grande do Sul: Lima, Vianna, Ferreira, & Irgang ICN.20982 (Ut--320453); Lindeman, Irgang, & Valls ICN.8484 (Ut--320454). URUGUAY: Herter 1000 [Herb. Herter 82763] (Mu).

VERBENA OVATA Cham.

Additional & emended bibliography: Buek, *Gen. Spec. Syn. Candoll.* 3: 495. 1858; Bolkh., Grif, Matvej., & Zakhar., *Chrom. Numb. Flow. Pl.*, imp. 1, 717 (1969) and imp. 2, 717. 1974; Moldenke, *Phytologia* 30: 161. 1975.

The corollas are said to have been "violet" on Schinini & Carnevali 10297 and the plant was found growing "en pantanos".

Additional citations: PARAGUAY: Fiebrig 502 (Mu--4040). ARGENTINA: Corrientes: Schinini & Carnevali 10297 (Ld).

VERBENA PARODII (Covas & Schnack) Moldenke

Additional & emended bibliography: Bolkh., Grif, Matvej., & Zakhar., *Chrom. Numb. Flow. Pl.*, imp. 1, 715 (1969) and imp. 2, 715. 1974; Moldenke, *Phytologia* 30: 162 (1975) and 31: 388. 1975.

Recent collectors have found this plant in fruit in November (in addition to the months previously reported by me). The corollas on Fabris & Schwabe 5022 are said to have been "lilac" in color when fresh.

Additional citations: ARGENTINA: Buenos Aires: Fabris & Schwabe 5022 (Mu). Mendoza: G. Dawson 3252 (Mu).

VERBENA PARVULA Hayek

Additional bibliography: López-Palacios, *Revist. Fac. Farm. Univ. Los Andes* 14: 23 (1974) and 15: 90 & 93. 1975; Moldenke, *Phytologia* 30: 162 (1975) and 34: 257 & 258. 1976; Soukup, *Biota* 11: 19. 1976; Moldenke, *Phytologia* 36: 30, 33, 52, 226, & 236. 1977.

Taylor has encountered this plant "in low forest and wet up-land pastures on mountain slopes" in Costa Rica. López-Palacios (1974) cites López-Palacios 2552 from Mérida, Venezuela, deposited in the Universidad de Los Andes herbarium. In his 1975 work he comments that "En los pocos ejemplares venezolanos (López-Palacios 2552 y Ruiz-Terán & López-Figueiros 2377), fuera de su hábito reducido no le encuentre diferencia alguna con la V. litoralis, y a mi modo de ver creo que esta especie no pasa de ser una forma anana de aquella, debida a las condiciones ecológicas desfavorables de clima y altura." He then quotes Macbride (1960) and concludes "En el primer párrafo simplemente he expuesto mi opinión para si algún día llega a tenerse en cuenta por quien se enfrente con la revisión del género."

Additional citations: COSTA RICA: Heredia: J. Taylor 17625 (N).

VERBENA PARVULA var. GIGAS Moldenke

Additional bibliography: Moldenke, *Phytologia* 24: 31. 1972; López-Palacios, *Revist. Fac. Farm. Univ. Los Andes* 15: 93. 1975; Soukup, *Biota* 11: 19. 1976; Moldenke, *Phytologia* 34: 257 & 258 (1976) and 36: 33. 1977.

Recent collectors have encountered this plant at altitudes of 2100—3600 meters. In addition to the months previously reported by me, it has been found in anthesis in May and in fruit in May and June.

López-Palacios describes it as "hierba erecta de ca. 60 cm. de aspecto similar a la V. litoralis, ca. de la cual crece, pero de hojas más pequeñas y más pilosas" and "hierba más o menos postrada, espigas algo cilíndricas, fl. violado-lilas". He found it flowering and fruiting in December and January.

Additional citations: ECUADOR: Chimborazo: Herb. Univ. Cent. Quito 2345 (Mu). Loja: López-Palacios 4164 (Ld). Pichincha: Herb. Univ. Cent. Quito 2340 (Mu), 2343 (Mu), 2346 (Mu); López-Palacios 4198 (Z). BOLIVIA: La Paz: W. Forster s.n. [8.I.1954] (Mu).

VERBENA PARVULA var. OBOVATA Moldenke, *Phytologia* 36: 52. 1977.

Bibliography: Moldenke, *Phytologia* 36: 52. 1977.

Citations: ECUADOR: Pichincha: López-Palacios 4250 (Z—type).

VERBENA PERAKII (Covas & Schnack) Moldenke

Additional & emended bibliography: Bolkh., Grif, Matvej., & Zakhar., *Chrom. Numb. Flow. Pl., imp. 1*, 715 & 717 (1969) and *imp. 2*, 715 & 717. 1974; Moldenke, *Phytologia* 30: 162. 1975.

VERBENA PERENNIS Wooton

Additional & emended bibliography: G. W. Thomas, *Tex. Pl. Ecol. Summ.* 78. 1969; Bolkh., Grif, Matvej., & Zakhar., *Chrom. Numb. Flow. Pl., imp. 1*, 717 (1969) and *imp. 2*, 717. 1974; Moldenke, *Phytologia* 30: 162 (1975) and 36: 244. 1977.

Higgins encountered this plant in gravelly to sandy or sandy

clay-loam soils in pinyon-juniper association, while the Corrells encountered it in "rocky soil in small mountains". Chiang and his associates found it growing in calcareous gravel in "isotal o matorral" on limestone hills, associated with Dasyllirion, Quercus, and Rhus. Hess & Stickney refer to it as a "common perennial, 60 cm. tall", with "blue-violet" corollas, and found it on slopes of low limestone hills in pinyon-juniper-grassland with Agave, Dasyllirion, Opuntia, Nolina, Rhus, Berberis, etc. The corollas are said to have been "purple" on Correll & Correll 30882. Thomas (1969) calls it "perennial verberna".

Additional citations: TEXAS: Brewster Co.: Hess & Stickney 3406 (N). Culberson Co.: Correll & Rollins 23897 (N). Pecos Co.: Correll & Correll 30882 (N). NEW MEXICO: Eddy Co.: Higgins 9228 (N). Guadalupe Co.: Higgins 8996 (N). MEXICO: Coahuila: Chiang C., Wendt, & Johnston 9178 (Ld).

VERBENA PERENNIS var. JOHNSTONI Moldenke

Additional bibliography: Moldenke, *Phytologia* 28: 367. 1974.

Henrickson found this plant to be "frequent perennial on rocky limestone slopes", at 4500 feet altitude, growing in association with Acacia, Dalea, Dasyllirion, Hilaria, Mimosa, and Yucca, flowering and fruiting in July. The corollas on his no. 11366 are said to have been "purple-blue" when fresh.

Additional citations: MEXICO: Coahuila: Henrickson 11366 (Ld).

xVERBENA PERPLEXA Moldenke

Additional bibliography: Moldenke, *Phytologia* 24: 33 (1972) and 36: 147. 1977.

Reeves encountered what appears to be this hybrid at an altitude of 3500 feet, flowering and fruiting in August, but misidentified it as V. ciliata Benth.

Additional citations: ARIZONA: Santa Cruz Co.: T. Reeves R. 1166 (W--2737258).

xVERBENA PERRIANA Moldenke

Additional synonymy: Verbena x perianna Perkins, Estes, & Thorp, *Bull. Torrey Bot. Club* 102: 197, in textu. 1975.

Additional bibliography: Perkins, Estes, & Thorp, *Bull. Torrey Bot. Club* 102: 194 & 197. 1975; Moldenke, *Phytologia* 30: 162 (1975), 34: 249, 250, & 279 (1976), and 36: 221. 1977.

The Iltis, Bell, Melchert, Patman, & Witt 12361, cited below, was previously incorrectly cited by me as V. hastata L. It was collected in flower and fruit in October.

Additional citations: ILLINOIS: Cass Co.: Geyer s.n. [Beardstown, July 1842] (Mu-416-cotype). WISCONSIN: Marquette Co.: Iltis, Bell, Melchert, Patman, & Witt 12361 (Ws). MISSOURI: Saint Louis: Engelmann s.n. [St. Louis] (Mu-417-cotype, Mu-1678-cotype).

VERBENA PERUVIANA (L.) Britton

Additional synonymy: Verbenella chamaedryfolia Juss. ex Spach, Hist. Nat. Veg. Phan. 9: 238. 1840. Verbena chamasedrufolia Robledo, Bot. Med. 392, sphalm. 1924. Verbena lindleyi Part., in herb.

Additional & emended bibliography: Loud., Hort. Brit., ed. 2, 552. 1832; Sweet, Hort. Brit., ed. 3, 553. 1839; Spach, Hist. Nat. Veg. Phan. 9: 238—239. 1840; Bart. in Loud., Hort. Brit. Suppl. [3]: 655. 1850; Buek, Gen. Spec. Syn. Candoll. 3: 494—496. 1858; Vilm., Fl. Pleine Terr., ed. 1, 939 (1865), ed. 2, 2: 976 (1866), ed. 3, 1: 1200 (1870), and ed. 4, 1067. 1894; Gilg in Engl., Syllab. Pflanzenfam., ed. 7, 314, fig. 413 D—F (1912) and ed. 8, 318, fig. 413 D—F. 1919; Knoche, Fl. Balear., imp. 1, 1: 59. 1921; Gilg in Engl., Syllab. Pflanzenfam., ed. 9 & 10, 339, fig. 418 D—F. 1924; Robledo, Bot. Med. 382. 1924; Pittier, Man. Pl. Usual. Venez. 395 & 450. 1926; Diels in Engl., Syllab. Pflanzenfam., ed. 11, 339, fig. 432 D—F & L. 1936; Bolkh., Grif, Matvej., & Zakhar., Chrom. Numb. Flow. Pl., imp. 1, 715—717. 1969; R. E. Harrison, Handb. Bulbs & Perenn. S. Hemisph., ed. 3, 266. 1971; Knoche, Fl. Balear., imp. 2, 1: 59. 1974; Kooiman, Act. Bot. Neerl. 24: 464. 1975; López-Palacios, Revist. Fac. Farm. Univ. Los Andes 15: 89. 1975; Moldenke, Phytologia 30: 139, 150, & 162—164 (1975), 31: 409—411 (1975), 34: 270 & 279 (1976), and 36: 122, 142, 153, & 228. 1977.

Additional & emended illustrations: Gilg in Engl., Syllab. Pflanzenfam., ed. 7, fig. 413 D—F (1912), ed. 8, 318, fig. 413 D—F (1919), and ed. 9 & 10, 339, fig. 418 D—F. 1924; Diels in Engl., Syllab. Pflanzenfam., ed. 11, 339, fig. 432 D—F. 1936; Melchior in Engl., Syllab. Pflanzenfam., ed. 12, 436, fig. 184 E & L (in part). 1964.

The corollas of this plant are described as "red" on Cristóbal & al. 1141 and on Schinini & Miranda 9576 and "very red" on Turner 9176. Gillanders and his associates (1973) recommend this plant for "sunny places and walls". Sweet (1830) says that this species was introduced into English gardens from Buenos Aires, Argentina, in 1827; he calls it the "scarlet-flowered vervain". Spach calls it the "verbénelle a feuilles de germandrée". Knoche (1921) reports it cultivated in the Balearic Islands, where it is called "carmelitana", a name also used for xv. hybrida Voss.

The Herb. Herter 82941, Herter 1057, Herzög 1217, and Pflanz 951, distributed as V. peruviana, are actually V. incisa Hook., while Hort. Parag. 11782 and T. Rojas 3395 are V. phlogiflora Cham., Block s.n. is V. rigida Spreng., and Torgo s.n. [Herb. Brad. 21257] is V. selloi Spreng.

Additional citations: URUGUAY: Herter 19 [Herb. Herter 71313] (Mu—4369). ARGENTINA: Buenos Aires: Cabrera & Fabris 14743 (Mu); Fabris 2707 (Mu). Córdoba: Lorentz 13 (Mu—1560); Lossen 10 (Mu—4368). Corrientes: Cristóbal, Quarín, Schinini, & Mirandi 1141 (Ld); Schinini & Mirandi 9576 (Ld). La Pampa: Fortuna s.

n. [15.XII.43] (Ut--330574B). Santa Fé: Turner 9176 (Ld). Tucumán: Meyer, Vaca, & Gómez 22305c (N). CULTIVATED: Belgium: Martens s.n. [h. b. lov.] (Mu--390). California: Germer s.n. [Los Angeles, 1876] (Mu--1279, Mu--1280). France: Weinkauff s.n. [Jard. des plant.] (Mu--1250). Germany: Herb. Kummer s.n. [Hort. bot. Monac.] (Mu--1249); Herb. Schwaegrichen s.n. [Hort. Lipsiensis] (Mu--1266); Herb. Staatsherb. München s.n. [18.I.1957] (Mu); Herb. Zuccarini s.n. [Hort. bot. Monac. 1834] (Mu--301), s. n. [Hort. Monac. 1846] (Mu--302). India: Herb. Hort. Bot. Calcutt. s.n. (Mu--1119).

VERBENA PERUVIANA f. ROSEA Moldenke

Additional bibliography: Anon., N. Y. Times D.41, April 6, 1975; Moldenke, Phytologia 30: 163--164, 1975.

Additional illustrations: Anon., N. Y. Times D.41, April 6, 1975.

It seems probable, from the illustration and description, that Stern's "Pink Princess" Trailing Verbena may well represent this form. In the advertisement cited in the bibliography above (1975) the plant is described as a "full-flowering Trailing Verbena", giving "a refreshing flowerfall of exquisite two-toned pink blooms all summer long" when grown in a hanging basket. It is said to bloom "continuously from spring 'til frost. Just fill flowerpots, planters, boxes or baskets with our brilliantly blooming 'Pink Princess (T)[-Trade name] Trailing Verbena and hang in full or part sun in your windows, but preferably outdoors on porch or patio. With a little loving care and plenty of watering, you can enjoy magnificent two-toned pink sprays all summer and fall! Pinch back stems for continual heavy blooming and lovely symmetrically shaped plants. Keep indoors over the winter and next spring enjoy another fantastic flowerfall"...."If you plant our Trailing Verbena 6" to 12" apart soon delicate pink blooms cover the ground in closely clustered waves of color to cover bare spots [as a groundcover]....create beautiful borders.. form a spectacular sea of pink under gladioli, lilies and other tall plants. And they keep producing flowers right up to the heavy frost! Not hardy -- so treat as Geraniums or Petunias".

VERBENA PHLOGIFLORA Cham.

Additional synonymy: Verbenella tweediana Hook. ex Spach, Hist. Nat. Veg. Phan. 9: 239. 1840. Verbena phlogiflora α vulgaris Schau. in A. DC., Prodr. 11: 537. 1847. Verbena phlogiflora α vulgaris [Cham.] ex Buek, Gen. Spec. Syn. Candoll. 3: 495. 1858. Verbena decemloba Mart. ex Moldenke, Phytologia 34: 278, in syn. 1976.

Additional & emended bibliography: G. Don in Loud, Hort. Brit. Suppl. 1: 680. 1832; Baxt. in Loud., Hort. Brit. Suppl. 2: 680. 1839; Sweet, Hort. Brit., ed. 3, 553. 1839; Spach, Hist. Nat. Veg. Phan. 9: 239. 1840; Baxt. in Loud., Hort. Brit. Suppl. [3]: 655.

1850; Buek, Gen. Spec. Syn. Candoll. 3: 494—496. 1858; Vilm., Fl. Fleine Terr., ed. 1, 939 (1865), ed. 2, 2: 976 (1866), ed. 3, 1: 1200 (1870), and ed. 4, 1067. 1894; Sonohara, Tawada, & Amano, Fl. Okin. 132. 1952; Bolkh., Grif, Matvej., & Zakhar., Chrom. Numb. Flow. Pl., imp. 1, 715 & 717 (1969) and imp. 2, 715 & 717. 1974; León & Alain, Fl. Cuba, imp. 2, 2: 282. 1974; Moldenke, Phytologia 30: 139, 140, 150, & 164 (1975), 31: 411 (1975), 34: 278 & 279 (1976), and 36: 47, 229, & 240. 1977.

Hatschbach has encountered this plant repent on dry rocky campos and in abandoned cultivated ground, while Schinini & Carnevali found it "en bajo pantanoso entre matas de gramíneas y ciperáceas". Others have encountered it "in wet drainage zone of campo at margin of capão or wood island" and in a "small campo on flat hilltop, an herb to 1 m. tall, living in forest margin". Bornmüller reports it from 400 m. altitude in Brazil; Quarín found it "en pantano" in Argentina.

The corollas on Hatschbach 35201 and on Schinini & Carnevali 10300 are said to have been "purple", those on Hatschbach 35172 & 35640 were "violet", those on Pabst 6093 and E. Pereira 6266 were "light-violet", and those on Quarín 2863 were lilac-violet". Lindeman & Haas describe the corollas on their no. 3998 as "purple (1/2P3/8)" and on their no. 1120 as "purple 10P7/6, above 10P5/10, center 10PB6-7/6".

Spach (1840) calls the species "verbénelle de Tweedie", while Sonohara and his associates (1952) call it "bijozakura". Sweet (1839) tells us that it was introduced into English gardens from South America before 1839.

Material of V. phlogiflora has been misidentified and distributed in some herbaria as V. chamaedryfolia Juss. On the other hand, the Rodriguez 530 [Herb. Inst. Miguel Lillo 31561], previously reported by me and distributed as V. phlogiflora, actually is V. spectabilis Moldenke, while Bornmüller 143 is V. incisa Hook.

Additional citations: BRAZIL: Minas Gerais: Duarte 6309 [Herb. Brad. 16885] (Mu); Widgren s.n. [1845] (Mu—1577). Paraná: Hatschbach 35172 (Ld), 35201 (Ld), 35640 (Ld), 39150 (Ld); Lindeman & Haas 1120 (Ut—320418), 3998 (Ld). Rio Grande do Sul: Bornmüller 160 (Mu—4294). Santa Catarina: Pabst 6093 [E. Pereira 6266; Herb. Brad. 22512] (Mu). São Paulo: Martius s.n. [Ypanema, Jan. 1818] (Mu—365), s.n. [Prov. St. Pauli] (Mu—366). PARAGUAY: T. Rojas 3395 [Herb. Parag. 11782] (Mu), 4736 (Mu). ARGENTINA: Corrientes: Quarín 2863 (Ld); Schinini & Carnevali 10300 (Ld).

VERBENA PINETORUM Moldenke

Additional bibliography: Moldenke, Phytologia 28: 372 (1974) and 36: 244. 1977.

The Walker collection cited below matches the type of the species very well, although the bracts are relatively longer than they are in some other collections referred here.

Additional citations: MEXICO: Chihuahua: S. Walker 76037 (N).

VERBENA PINNATILOBA (Kuntze) Moldenke

Additional bibliography: Moldenke, *Phytologia* 24: 40—41. 1972.

The corollas are said to have been "blue" on Ibarrola 542.

Additional citations: ARGENTINA: Corrientes: Ibarrola 542 (Ut—3305818).

VERBENA PLATENSIS Spreng.

Additional bibliography: Loud., *Hort. Brit.*, ed. 2, 552. 1832; G. Don in Loud., *Hort. Brit. Suppl.* 2: 704. 1839; Sweet, *Hort. Brit.*, ed. 3, 553. 1839; Bart. in Loud., *Hort. Brit. Suppl.* [3]: 655. 1850; Busk, *Gen. Spec. Syn. Candoll.* 3: 495 & 496. 1858; Vilm., *Fl. Pleine Terr.*, ed. 1, 938—939 (1865), ed. 2, 2: 976 (1866), ed. 3, 1: 1199—1200 (1870), and ed. 4, 1066—1067 & 1070. 1894; Bolkh., Grif, Matvej., & Zakhar., *Chrom. Numb. Flow. Pl.*, imp. 1, 715 & 717 (1969) and imp. 2, 715 & 717. 1974; El-Gazzar, *Egypt. Journ. Bot.* 17: 75 & 78. 1974; Molina R., *Ceiba* 19: 96. 1975; Moldenke, *Phytologia* 30: 150 & 164—165 (1975), 31: 392 & 412 (1975), and 34: 270. 1976.

Additional illustrations: Voss in Vilm., *Fl. Pleine Terr.*, ed. 4, 1066. 1894.

Molina R. (1975) records this species as cultivated in Honduras, but I suspect that he may actually be referring to white-flowered forms of *V. hybrida* Voss which would be far more likely to be found there.

Sweet (1839), calling *V. platensis* the "germander-like vervain", asserts that it was introduced into English gardens from Buenos Aires, Argentina, in 1837. The corollas on the Cabrera & al. collections and on Lossen 117, cited below, are said to have been "white" when fresh.

Additional citations: URUGUAY: Herter 750a [*Herb. Herter* 85298] (Mu). ARGENTINA: Buenos Aires: Cabrera & Fabris 16531 (Mu). Córdoba: Lossen 117 (Mu—4376). Jujuy: Cabrera, Arambarri, Cabrera, & Malacalza 17276 (Mu). CULTIVATED: Germany: Herb. Reg. Monac. s.n. [*Hort. Monac.* 1849.16.VIII] (Mu—393); Herb. Zuccarini s.n. [*hort. Monac.* 1840] (Mu—394), s.n. [*hort. Monac.* 1846] (Mu—395); Prince Paul of Wurtemberg s.n. [*Hort. Mergentheim* 1840] (Mu—1583).

VERBENA PLATENSIS f. IVERIANA (Bosse) Moldenke

Additional bibliography: Moldenke, *Phytologia* 30: 164—165 (1975) and 31: 392 & 412. 1975.

VERBENA PLICATA Greene

Additional & emended bibliography: G. W. Thomas, *Tex. Pl. Ecol. Summ.* 78. 1969; Bolkh., Grif, Matvej., & Zakhar., *Chrom. Numb. Flow. Pl.*, imp. 1, 717 (1969) and imp. 2, 717. 1974; E. H. Jordan, *Checklist Organ Pipe Cactus Natl. Mon.* 7. 1975; Moldenke, *Phytologia* 30: 156 & 165 (1975) and 36: 244. 1977.

The Spellenbergs found this plant growing "in large open grassy areas with mesquite and *Ephedra* in a low swale, densely grassy and

weedy, with much tobosa and desert-willow". Other recent collectors have encountered it in calcareous gravel in "matorral desértico inerme on limestone hills and north-facing fans", growing in association with Agave lecheguilla, Cordia parvifolia, Larrea tridentata, and Grusonia. Higgins encountered it "on gravelly exposed limestone outcrops in Acacia-Prosopis-Sophora association" and "in sandy to gravelly limestone soils in Larrea-Acacia-Prosopis association".

The corollas on Chiang, Wendt, & Johnston 9137 are said to have been "lavender" in color when fresh, while those on Spellenberg & Spellenberg 3823 were "pale blue-lavender". Mrs. Jordan (1975) calls this the "ribbed vervain".

The Reeves R.1198, distributed as V. plicata, actually is V. neomexicana (A. Gray) Small, while R. V. Moran 16893, 20727, 20748, & 21749 are V. neomexicana var. hirtella Perry.

Additional citations: OKLAHOMA: Jackson Co.: Waterfall 11980 (M). TEXAS: Presidio Co.: Higgins, Higgins, & Higgins 9867 (N), Val Verde Co.: Higgins, Higgins, & Higgins 9964 (N). NEW MEXICO: Hidalgo Co.: Spellenberg & Spellenberg 2823 (Id, N). MEXICO: Coahuila: Chiang, Wendt, & Johnston 9137 (Id).

VERBENA PLICATA var. DEGENERI Moldenke

Additional bibliography: G. W. Thomas, *Tex. Pl. Ecolog. Summ.* 78. 1969; Moldenke, *Phytologia* 24: 46. 1972.

Thomas (1969) calls this the "Degener verbena". It seems most likely to me now that this taxon is not worthy of more than form rank.

VERBENA POGOSTOMA Klotzsch

Additional bibliography: Buek, *Gen. Spec. Syn. Candoll.* 3: 495. 1858; Moldenke, *Phytologia* 24: 46. 1972; Soukup, *Biota* 11: 19. 1976.

VERBENA PORRIGENS R. A. Phil.

Additional bibliography: Moldenke, *Phytologia* 30: 165. 1975.

The Werdermann 789, distributed as V. porrigens, actually is V. atacamensis Reiche.

VERBENA PULCHELLA Sweet

Emended synonymy: Glandularia pulchella Sweet ex Spach, *Hist. Nat. Veg. Phan.* 9: 240. 1840; Troncoso & Cabrera, *Fl. Prov. Buenos Aires* 137. 1965.

Additional & emended bibliography: Sweet, *Hort. Brit.*, ed. 2, 419. 1830; G. Don in Loud., *Hort. Brit. Suppl.* 1: 680. 1832; Loud., *Hort. Brit.*, ed. 2, 552. 1832; Baxt. in Loud., *Hort. Brit. Suppl.* 2: 680. 1839; Sweet, *Hort. Brit.*, ed. 3, 553. 1839; Spach, *Hist. Nat. Veg. Phan.* 9: 240—241. 1840; Schau. in A. DC., *Prodr.* 11: 552. 1847; Baxt. in Loud., *Hort. Brit. Suppl.* [3]: 655. 1850; Buek,

Gen. Spec. Syn. Candoll. 3: 495. 1858; Vilm., Fl. Pleine Terr., ed. 1, 937-938 (1865), ed. 2, 2: 975 (1866), ed. 3, 1: 1198 (1870), and ed. 4, 1066. 1894; Moldenke, Phytologia 30: 166 & 172 (1975), 34: 279 (1976), and 36: 139, 153, 231, & 240. 1977.

Additional illustrations: Voss in Vilm., Fl. Pleine Terr., ed. 4, 1066. 1894.

Vilmorin (1863) calls this species "verveine délicate", while Spach (1840) calls it "glandularia élégant". Sweet (1830) calls it the "pretty vervain" and avers that it was introduced into English gardens from Buenos Aires, Argentina, in 1827.

The Hiendlmayr s.n. [Hort. Lipsiensis], Herb. Zuccarini s.n. [h. Monac. 1836], and Herb. Kummer s.n. [h. Paris.], distributed as V. pulchella, actually are V. tenuisecta Briq.

Additional citations: URUGUAY: Herter 1805 [Herb. Herter 96556] (Mu).

VERBENA PULCHELLA f. COROLLA-ALBIDA Bart.

Additional bibliography: G. Don in Loud., Hort. Brit. Suppl. 1: 680. 1832; Bart. in Loud., Hort. Brit. Suppl. 2: 680. 1839; Sweet, Hort. Brit., ed. 3, 556. 1839; Moldenke, Phytologia 28: 375. 1974.

VERBENA PUMILA Rydb.

Additional synonymy: Verbena pumila "Rydb. in Small" ex G. W. Thomas, Tex. Pl. Ecolog. Summ. 78. 1969.

Additional & emended bibliography: G. W. Thomas, Tex. Pl. Ecolog. Summ. 78. 1969; Bolkh., Grif, Matvej., & Zakhar., Chrom. Numb. Flow. Pl., imp. 1, 717 (1969) and imp. 2, 717. 1974; Hinton & Rzedowski, Anal. Esc. Nac. Cienc. Biol. 21: 111. 1975; Moldenke, Phytologia 30: 166 (1975), 31: 392 (1975), 34: 279 (1976), and 36: 141 & 147. 1977.

The D. Wright 23, distributed as V. pumila, actually is V. bipinnatifida Nutt.

Additional citations: OKLAHOMA: Comanche Co.: Waterfall 11938 (M1). TEXAS: Comal Co.: Lindheimer 1075 (Mu-4087). Young Co.: Correll & Johnston 22126 (N). County undetermined: Lindheimer IV.501 (Mu-268).

VERBENA PUMILA f. ALBIDA Moldenke

Additional bibliography: Moldenke, Phytologia 30: 166 (1975) and 31: 392. 1975.

VERBENA QUADRANGULATA Heller

Additional & emended bibliography: G. W. Thomas, Tex. Pl. Ecolog. Summ. 78. 1969; Bolkh., Grif, Matvej., & Zakhar., Chrom. Numb. Flow. Pl., imp. 1, 717 (1969) and imp. 2, 717. 1974; Moldenke, Phytologia 30: 166 (1975), 34: 252 (1976), and 36: 147. 1977.

Thomas (1969) calls this the "four-angle verbena". Recent collectors have encountered it in calcareous gravelly loam "in izotal in canyon through limestone plateau", in calcareous rocky loam "in

crasirosulifolio espinosos on limestone hills", in sandy alluvium in "matorral desértico inerme on sandy fans", and in gypsiferous clay-loam on limestone ridges in association with Agave lecheguilla, A. falcata, A. asperrima, Fouquieria splendens, Yucca filifera, Acacia rigidula, Opuntia leptocaulis, O. rufida, Hechtia, Larrea, Dasyliirion, Nolina, Quercus, and Prosopis.

Additional citations: TEXAS: Duval Co.: Croft s.n. [San Diego, 1885] (Mu). Nueces Co.: A. A. Heller 1388 (Ln--70254--isotype). MEXICO: Coahuila: Johnston, Wendt, & Chiang C. 10602a (Ld). Nuevo León: Johnston, Wendt, & Chiang C. 10209a (Ld), 10226e (Ld), 10248h (Ld).

VERBENA RACEMOSA Eggert

Additional & emended bibliography: G. W. Thomas, Tex. Pl. Ecol. Summ. 78. 1969; Bolkh., Grif, Matvej., & Zakhar., Chrom. Numb. Flow. Pl., imp. 1, 717 (1969) and imp. 2, 717. 1974; Moldenke, Phytologia 30: 167 (1975) and 36: 244. 1977.

Strohmeyer describes this plant as having "stems several from taproot, apparently annual base, without old stems, the taproot only 3 mm. across at thickest point", and encountered it on a river floodplain, flowering and fruiting in April. The corollas on Meebold 26696 are described as having been "white" when fresh.

Additional citations: TEXAS: Brewster Co.: Strohmeyer s.n. [4 April 1975] (Ld, Z). NEW MEXICO: Dona Ana Co.: Meebold 26696 (Mu).

VERBENA RADICATA Moldenke

Additional & emended bibliography: G. Don in Loud., Hort. Brit. Suppl. 1: 680. 1832; Sweet, Hort. Brit., ed. 3, 768. 1839; Bart. in Loud., Hort. Brit. Suppl. 2: 680 (1839) and [3]: 655. 1850; Buek, Gen. Spec. Syn. Candoll. 3: 495. 1858; Bolkh., Grif, Matvej., & Zakhar., Chrom. Numb. Flow. Pl., imp. 1, 715 & 717 (1969) and imp. 2, 715 & 717. 1974; Hocking, Excerpt. Bot. A. 23: 290 & 291. 1974; Moldenke, Phytologia 28: 372 & 377. 1974.

Sweet (1839), calling this the "rooting vervain", avers that it was introduced into English gardens from Chile in 1832.

VERBENA RADICATA var. GLABRA (Hicken) Moldenke

Additional & emended bibliography: Hocking, Excerpt. Bot. A. 23: 290 & 291. 1974; Moldenke, Phytologia 28: 377. 1974.

VERBENA RECTA H.B.K.

Additional bibliography: Buek, Gen. Spec. Syn. Candoll. 3: 495. 1858; Moldenke, Phytologia 28: 377--378. 1974; Hinton & Rzedowski, Anal. Esc. Nac. Cienc. Biol. 21: 111. 1975; Moldenke, Phytologia 36: 145. 1977.

Beaman encountered this species in small open grassy meadows surrounded by Abies forest.

Additional citations: MEXICO: Michoacán: Beaman 4353 (Ln--171723). Oaxaca: Pringle 4769 (Ln--70253, Mu). State undetermined: Karwin-

ski s.n. (Mu--300).

VERBENA RECTILOBA Moldenke

Additional bibliography: Moldenke, *Phytologia* 28: 378 & 440. 1974; Hoeking, *Excerpt. Bot. A.* 26: 4. 1975.

VERBENA REGNELLIANA Moldenke

Additional bibliography: Moldenke, *Phytologia* 24: 127 (1972) and 36: 231. 1977.

Martius s.n., cited below, was collected in anthesis in February and the corollas are said to have been "lilac" in color when fresh. It was misidentified and distributed as V. erinoides Lam.

Additional citations: BRAZIL: Minas Gerais: Martius s.n. [ad S. João d'El Rey, Febr.] (Mu--309).

VERBENA RIBIFOLIA Walp.

Additional bibliography: Buek, *Gen. Spec. Syn. Candoll.* 3: 495. 1858; Moldenke, *Phytologia* 28: 378. 1974.

VERBENA RIBIFOLIA var. **LONGAVINA** (R. A. Phil.) Acevedo de Vargas

Additional bibliography: Moldenke, *Phytologia* 24: 127--128. 1972.

Additional citations: CHILE: Province undetermined: Philippi s. n. [Hacienda de Cauquenes] (Mu--1579).

VERBENA RIGIDA Spreng.

Additional synonymy: Verbena venosa var. aspera Lorenz ex Moldenke, *Phytologia* 34: 279, in syn. 1976.

Additional & amended bibliography: G. Don in Loud., *Hort. Brit. Suppl.* 1: 602 & 680. 1832; Loud., *Hort. Brit.*, ed. 2, 552 & 602 (1832) and ed. 3, 602. 1839; Sweet, *Hort. Brit.*, ed. 3, 553. 1839; Bart. in Loud., *Hort. Brit. Suppl.* 2: 680 (1839) and [3]: 655. 1850; Buek, *Gen. Spec. Syn. Candoll.* 3: 494--496. 1858; Vilm., *Fl. Fleine Terr.*, ed. 1, 937 (1865), ed. 2, 2: 974 (1866), ed. 3, 1: 1198 (1870), and ed. 4, 1065. 1894; Pittier, *Man. Pl. Usual. Venes.* 398 & 450. 1926; Ewan in Thieret, *Southwest. La. Journ.* 7: 11 & 42. 1967; Bolkh., Grif, Matvej., & Zakhar., *Chrom. Numb. Flow. Pl.*, imp. 1, 717. 1969; G. W. Thomas, *Tex. Pl. Ecol. Summ.* 78. 1969; R. E. Harrison, *Handb. Bulbs & Peren. S. Hemisph.*, ed. 3, 266. 1971; Healy, *Gard. Guide Pl. Names* 225. 1972; Williamson, *Sunset West. Gard. Book*, imp. 11, 437. 1973; Bolkh., Grif, Matvej., & Zakhar., *Chrom. Numb. Flow. Pl.*, imp. 2, 717. 1974; R. D. Gibbs, *Chemotax. Flow. Pl.* 3: 1752--1755 (1974) and 4: 2295. 1974; S. B. Jones, *Castanea* 39: 137. 1974; León & Alain, *Fl. Cub.*, imp. 2, 281 & 282, fig. 121 B. 1974; Duncan & Foote, *Wildfls. SE. U. S.* 150, [151], & 295. 1975; Kooiman, *Act. Bot. Neerl.* 24: 464. 1975; Lopez-Palacios, *Revist. Fac. Farm. Univ. Los Andes* 15: 93. 1975; Moldenke, *Phytologia* 30: 134 & 167--168 (1975), 31: 374--376, 387, 392, & 409 (1975), and 34: 20, 250, 260, & 279. 1976; Park Seed Co., *Park Seeds Fls. & Veg.* 1976: 90. 1976; Moldenke, *Phytologia* 36: 47, 131, 141, 226, & 228. 1977.

Additional illustrations: Voss in Vilm., Fl. Fleine Terr., ed. 3, 1: 1198 (1870) and ed. 4, 1065. 1894; León & Alain, Fl. Cuba, imp. 2, 281, fig. 121 B. 1974; Duncan & Foote, Wildfls. SE. U. S. [151] (in color). 1975.

Pittier (1926) records the popular name, "virginia", for this species in Venezuela, while Thomas (1969) calls it "veiny verbena" and Walker (1976) records "bijo-zakura" [bijo, a beautiful woman, zakhura, flowering cherry]. The corollas on Correll & Rollins 21061 are said to have been "deep reddish-purple".

López-Palacios (1975) comments that this species "Es originaria del sur del Continente, pero ha sido difundida ampliamente en cultivos de jardines botánicos y particulares, aunque en Venezuela aún no es muy abundante. Desde el punto de vista taxonómico, es inconfundido con las restantes especies venezolanas y fácilmente distinguible por sus hojas de ancha base semiabrazadoras o subcordadas."

Balakrishnan refers to this plant as a "0.5 m. tall shrub with mauve flowers", but this is certainly either an error in observation [since the plant is not a shrub] or a case of mixed labels. If the label accompanying the collection is correct in other details, he encountered the species in open places along railroad tracks [a very typical habitat], at 2400 meters altitude, flowering in December. Griffiths refers to it as a "fleshy rhizomatous perennial, 6--15 inches tall, single- to multi-stemmed; stems green, basally and apically flushed purplish-red, square, well-foliaged; leaves semi-erect, decussate, dark-green; inflorescence dense, near-capitate, compound, those on major peduncles more or less well separated; flowers deep bluish-purple, richly colorful".

Other recent collectors describe the stems as scabrous, 4 mm. in diameter, and the corolla slightly longer than the calyx. They have encountered it in well-drained soil in association with Baptisia and in sandy clay in oak-pine flatwoods. Spindler refers to it as "infrequent in pastures or sandy soil". Godfrey speaks of the plant as "locally abundant" in old fields. Mrs. Clemens found it on the "margin of grasslands" in Queensland, while Codd refers to it as "occasional patches on roadsides" in the Transvaal. Ghazal found it to be "widespread" in Louisiana. My wife and I found it locally and sporadically very abundant on grassy road shoulders and along fencerows in North and South Carolina, Georgia, and Florida, although not as widespread as V. temisecta in those states. Thomas reports it naturalized in a Louisiana cemetery.

Sweet (1839) calls this species the "strong-veined" and "wrinkled" vervain, introduced into English gardens from Buenos Aires, Argentina, in 1837.

The corollas on Ardoin 21, Hatschbach HH.10300, Herb. Brad. 30320, Kummrow 775, and E. Pereira 7683 are described as having been "violet" in color when fresh, while those on Codd 10208 were "dark-purple", those on C. M. Allen 658, Curry, Martin, & Allen 273, Darus 124, and Lemmon 1100 were "purple", those on Augustin

37 and Horst JWH.B.281 were "deep-purple", on Vann 22 "bright-purple", on Bougere 2113 "lavender-purple", on Gonella 24 "purple to violet", on Webster & Wilbur 3352 "lavender", and those on E. Pereira 5187 "roxo-claro".

Gibbs (1974) reports leucoanthocyanin absent from the leaves of this species, cyanogenesis absent from the stems and leaves, syringin absent from the stems, and the Ehrlich test giving negative results in the leaves.

The Herb. Kummer s.n. [Hort. bot. Monac.] collection, cited below, is a mixture with V. hispida Ruiz & Pav., while Hatschbach HH.10300, Herb. Brad. 30320, and E. Pereira 7682 are mixtures with V. rigida var. obovata (Hayek) Moldenke rather than var. glandulifera Moldenke as distributed by the collectors.

Additional citations: NORTH CAROLINA: Harnett Co.: Moldenke & Moldenke 30003 (Gz). SOUTH CAROLINA: Allendale Co.: Moldenke & Moldenke 29961 (Ac, Gz, Ld, Tu). Clarendon Co.: Moldenke & Moldenke 29974 (Ac, Ld, Tu). GEORGIA: Carlton Co.: Moldenke & Moldenke 29279 (Ld). Coweta Co.: Moldenke & Moldenke 29304 (Ac). Lee Co.: Moldenke & Moldenke 29344 (Kh), 29360 (Gz). Meriwether Co.: Moldenke & Moldenke 29305 (Gz). Schley Co.: Moldenke & Moldenke 29330 (Kh). Sumter Co.: Moldenke & Moldenke 29339 (Ld). Talbot Co.: Moldenke & Moldenke 29317 (Tu). FLORIDA: Hernando Co.: Moldenke & Moldenke 29495 (Tu). Leon Co.: Godfrey 72332 (W—2734291). ALABAMA: Sumter Co.: J. A. Churchill s.n. [10 May 1955] (Ln—204151); R. Kral 26416 (Lc). MISSISSIPPI: Rankin Co.: Webster & Wilbur 3352 (Mi). LOUISIANA: East Baton Rouge Par.: Beck 453 (Lv); E. A. Bessey s.n. [VII.14.09] (Lv, Lv, Lv); Block s.n. (Lv); C. A. Brown 1054 (Lv), 17096 (Lv); Correll & Correll 10449 (Lv); Gonella 24 (Lv); Horst JWH.B.281 (Lv); Lawrence & Crawford s.n. [Oct. 4, 1916] (Lv); N. E. Petersen s.n. [March 17, 1909] (Lv), s.n. [May 7, 1909] (Lv); W. D. Phillips s.n. [March 1904] (Lv); Ross 67 (Lv). East Feliciana Par.: C. A. Brown 18587 (Lv); Darus 124 (Lv); Ghazali s.n. [Idlewild Exp. Sta.] (Ld). Lafayette Par.: B. E. Lemmon 1100 (Lv). Livingston Par.: Beck 166 (Lv); Montz 1895 (Lv); Vann 22 (Lv). Ouachita Par.: Thomas & Reid 24091 (K1—21812). Pointe Coupee Par.: M. Chaney 393 (Lv). Saint Helena Par.: C. M. Allen 658 (Lv). Saint Landry Par.: Ardoin 21 (Lv). Saint Mary Par.: C. A. Brown 6569 (Lv); Bynum, Ingram, & Jaynes s.n. [Apr. 13, 1933] (Lv); J. A. Churchill s.n. [2 May 1955] (Ln—204157); Correll & Correll 9346 (Lv). Saint Tammany Par.: Arsène 11080 (Lv); Bougere 2113 (Lv); C. A. Brown 17736 (Lv); N. F. Petersen s.n. [Oct. 9, 1909] (Lv). Tangipahoa Par.: Kirby 116 (Lv); H. R. Wilson 82 (Lv). Terrebonne Par.: Arceneaux 35a (Lv). Union Par.: R. D. Thomas 23465 (K1—21955). Washington Par.: C. A. Brown 18429 (Lv). West Feliciana Par.:

Augustin 37 (Lv); Curry, Martin, & Allen 273 (Lv); Spindler 82 (Lv). TEXAS: Waller Co.: Correll & Rollins 21061 (N). BRAZIL: Paraná: Kummrow 775 (Ld); E. Pereira 5187 [Herb. Brad. 13596] (Mu), 7683, in part [Hatschbach HH.10300; Herb. Brad. 30320] (Mu). ARGENTINA: Buenos Aires: Lorenz 2289 (Mu—1833). Province undetermined: Freiland s.n. [Aug. 1902] (Mu). SOUTH AFRICA: Transvaal: Codd 10208 (Mu). State undetermined: Penther 1764 [Komgha] (Mu). SRI LANKA: Balakrishnan NBK.413 (W—2721204). AUSTRALIA: New South Wales: Meebold 3187 (Mu). Queensland: M. S. Clemens 42111 (Mi), 42206 (Mi). CULTIVATED: California: A. Griffiths 4515 [LASCA 55-E-935] (Sd—90062). Germany: Herb. Kummer s.n. [Hort. Nymphenbergensis 1840] (Mu—1677), s.n. [Hort. bot. Monac.] (Mu); Herb. Schwaegrichen s.n. (Mu—1275); Herb. Von Schönau s.n. (Mu); Herb. Zuccarini s.n. [Hort. bot. Monac. 1836] (Mu—4118).

VERBENA RIGIDA var. GLANDULIFERA Moldenke

Additional synonymy: Verbena rigida var. glandulos Moldenke, Phytologia 34: 279, in syn. 1976. Verbena rigida var. glandulosa Moldenke, Phytologia 34: 279, 1976.

Additional bibliography: Moldenke, Phytologia 24: 132 (1972), 34: 279 (1976), and 36: 47, 1977.

Hatschbach refers to this plant as ruderal and found it in flower and fruit in December. The corollas on his no. 37899 are said to have been "lilac" in color when fresh.

The Hatschbach HH.10368, Herb. Brad. 30089 & 30956, Pabst 7898, and E. Pereira 7752 & 8623, distributed as V. rigida var. glandulifera, actually are var. obovata (Hayek) Moldenke, while Hatschbach HH.10300, Herb. Brad. 30320, and E. Pereira 7683 are mixtures of V. rigida Spreng. and V. rigida var. obovata.

Additional citations: BRAZIL: Paraná: Hatschbach 37899 (Ld).

VERBENA RIGIDA var. LILACINA (Benary & Bodger) Moldenke

Additional synonymy: Verbena lilacina Harrison, Handb. Bulbs & Peren. S. Hemisph., ed. 3, 266, 1971.

Additional bibliography: R. E. Harrison, Handb. Bulbs & Peren. S. Hemisph., ed. 3, 266, 1971; Moldenke, Phytologia 28: 381 (1974), 31: 387 & 392 (1975), and 34: 279, 1976.

Ferreira encountered this plant growing at the edge of railroad tracks, flowering and fruiting in October, describing the corolla color as "lilac". It is very probable that some of the collections cited under typical V. rigida, whose flowers are described by their collectors as "lila" may belong here, but until it is definitely ascertained what collectors mean by "lila" it is, perhaps, best to leave them under the typical form.

Additional citations: BRAZIL: Paraná: L. F. Ferreira 117 (Ld).

VERBENA RIGIDA var. OBOVATA (Hayek) Moldenke

Additional bibliography: Moldenke, Phytologia 24: 220, 1972.

Porto & Oliveira describe this plant as an herb to 50 cm. tall and the corolla color as "roxas 5Pl/11", while Lindeman and his associates refer to the corolla color as "roxas 4P5/8" and found the plant growing in "terrena baldio". The corollas on Herb. Brad. 30956, Pabst 7898, and E. Pereira 8623 were "roxas", while those on Bornmüller 204 are said to have been "hellrosa" [=light pink] when fresh.

Hatschbach HH.10300, Herb. Brad. 30320, and E. Pereira 7683, cited below, are mixtures of this variety and typical V. rigida Spreng.

Material of this variety has been misidentified and distributed in some herbaria as V. rigida var. glandulifera Moldenke.

Additional citations: BRAZIL: Paraná: E. Pereira 7683, in part [Hatschbach HH.10300; Herb. Brad. 30320] (Mu), 7752 [Hatschbach HH.10368; Herb. Brad. 30089] (Mu). Rio Grande do Sul: Bornmüller 162 (Mu-4292), 204 (Mu-4293); Lindeman, Irgang, & Valls ICN. 8775 (Ut-320450); E. Pereira 8623 [Pabst 7898; Herb. Brad. 30956] (Mu); Porto & Oliveira ICN.9584 (Ut-320449). ARGENTINA: Corrientes: Krapovickas, Cristóbal, Schinini, & González 25650 (Ld).

VERBENA RIGIDA f. PARAGUAYENSIS Moldenke, *Phytologia* 34: 20. 1976.

Bibliography: Moldenke, *Phytologia* 34: 20 & 260. 1976.

Citations: PARAGUAY: T. Rojas 3407 [Hort. Parag. 11794] (Mu—type, Z—isotype, Z—photo of type).

VERBENA RIGIDA var. REINECKII (Briq.) Moldenke

Additional bibliography: Moldenke, *Phytologia* 24: 133. 1972.

Additional citations: BRAZIL: Rio Grande do Sul: Reineck & Czermak 68 (Mu-3492).

VERBENA RINCONENSIS Moldenke

Additional bibliography: Moldenke, *Phytologia* 24: 133 (1972) and 34: 252. 1976.

Henrickson reports this plant "infrequent in open desert" and "infrequent annual among Larrea on rocky limestone hillside with Chihuahuan Desert vegetation", associated with Berberis, Bouvardia, Dasylyrin, Dyssodia, Fouquieria, Opuntia, Psatrophe, Yucca, grasses, etc., at 2200—2365 m. altitude, flowering and fruiting in August and September.

Additional citations: MEXICO: Zacatecas: Henrickson 6295 (Ld), 6698 (Ld).

VERBENA RIPARIA Raf.

Additional bibliography: Moldenke, *Phytologia* 28: 381, 399, & 464 (1974) and 30: 159. 1975.

The Montz 2294, distributed as V. riparia, actually is V. nutha Lehm.

Additional citations: VIRGINIA: Smyth Co.: J. K. Small s.n. [July 1, 1892] (Lv).

VERBENA ROBUSTA Greene

Additional synonymy: Verbena prostrata var. glandulosa Dunkle, in herb.

Additional bibliography: R. D. Gibbs, Chemotax. Flow. Pl. 3: 1752 & 1755 (1974) and 4: 2295. 1974; Moldenke, Phytologia 30: 168 (1975) and 36: 221 & 232. 1977.

Moran reports this plant "occasional by streams" in Baja California, while Thorne found it growing in association with Baccharis glutinosa, Ambrosia psilostachya, etc., along streams on Santa Catalina island.

Dunkle's V. prostrata var. glandulosa seems to be based on his no. 8548 from a dry stream bed on Santa Cruz island in the Channel Islands of California, where he collected it in flower and fruit in August.

Gibbs (1974) reports leucoanthocyanin absent from the leaves of V. robusta, saponin also absent, but tannin probably present.

The Blakley 5394, distributed as V. robusta, is actually V. bracteata Lag. & Rodr.

Additional citations: CALIFORNIA: Alameda Co.: Hillebrand 1863 (Mu). CHANNEL ISLANDS: Santa Catalina: Thorne 36670 (Sd—69572). Santa Cruz: Dunkle 8548 (N). MEXICO: Baja California: Meebold 20234 (Mu); R. V. Moran 16655 (Sd—73068).

VERBENA RUFIFLORA Rojas

Additional & emended bibliography: Krapovickas, Bol. Soc. Argent. Bot. 11: Supl. 269. 1970; Moldenke, Phytologia 30: 168 (1975) and 31: 388. 1975.

VERBENA RUNYONI Moldenke

Additional bibliography: G. W. Thomas, Tex. Pl. Ecolog. Summ. 78. 1969; Moldenke, Phytologia 28: 382. 1974; D. S. & H. B. Correll, Aquat. & Wetland Pl. SW. U. S., imp. 2, 2: 1397, 1400, & 1775. 1975; Moldenke, Phytologia 34: 153. 1976.

Thomas (1969) calls this the "Runyon verbena".

VERBENA RUNYONI f. ROSIFLORA L. I. Davis

Additional bibliography: Moldenke, Phytologia 28: 382. 1974; D. S. & H. B. Correll, Aquat. & Wetland Pl. SW. U. S., imp. 2, 2: 1397, 1400, & 1775. 1975.

xVERBENA RYDBERGII Moldenke

Additional bibliography: R. A. Davidson, State Univ. Iowa Stud. Nat. Hist. 20 (2): 77. 1959; Moldenke, Phytologia 30: 145 & 168 (1975), 31: 377 (1975), 34: 270 (1976), and 36: 29. 1977.

Davidson (1959) records this hybrid from Louisa and Muscatine Counties, Iowa, where he found it in a swamp and on sandy slopes above a bog.

Additional citations: MISSOURI: Saint Louis: Engelmann s.n. [Banks of the Mississippi, July 1842] (Mu—361). CULTIVATED: Germany: Herb. Staatsherb. Münch. s.n. [Hort. bot. Monac. 28.7.53] (Mu).

VERBENA SAGITTALIS Cham.

Additional bibliography: Buek, Gen. Spec. Syn. Candoll. 3: 495. 1858; Moldenke, Phytologia 28: 383. 1974.

VERBENA SANTIAGUENSIS (Covas & Schnack) Moldenke

Emended synonymy: Glandularia santiaguensis Covas & Schnack ex Bolkh., Grif, Matvej., & Zakhar., Chrom. Numb. Flow. Pl., imp. 1, 715, sphalm. 1969.

Additional & emended bibliography: Bolkh., Grif, Matvej., & Zakhar., Chrom. Numb. Flow. Pl., imp. 1, 715 (1969) and imp. 2, 715. 1974; Moldenke, Phytologia 28: 383 & 457--458 (1974) and 30: 178. 1975.

Recent collectors refer to this as a decumbent plant and have found it growing on low campos, flowering in November and December. The corollas are described as having been "purple" on Quarín, Schinini, & González 2437 and as "violet" in color on Krapovickas, Schinini, & Quarín 26701.

Additional citations: ARGENTINA: Corrientes: Quarín, Schinini, & González 2437 (Ld). Salta: Krapovickas, Schinini, & Quarín 26701 (Z).

VERBENA SANTIAGUENSIS (Covas & Schnack) Moldenke x V. PERUVIANA (L.) Britton

Additional bibliography: Moldenke, Phytologia 28: 383, 457, & 458. 1974.

VERBENA SANTIAGUENSIS f. ALBIFLORA Moldenke

Additional bibliography: Moldenke, Phytologia 24: 138. 1972.

Troncoso states that in her opinion the type sheet of this form is what she calls Glandularia pulchella var. gracilior Troncoso.

VERBENA SCABRA Vahl

Additional bibliography: Sweet, Hort. Brit., ed. 1, 1: 325. 1826; G. Don in Loud., Hort. Brit., ed. 1, 247 (1830) and ed. 2, 247. 1832; Loud., Hort. Brit., ed. 2, 552. 1832; G. Don in Loud., Hort. Brit., ed. 3, 247. 1839; Sweet, Hort. Brit., ed. 3, 553. 1839; Buek, Gen. Spec. Syn. Candoll. 3: 495. 1858; G. W. Thomas, Tec. Pl. Ecolog. Summ. 78. 1969; Fong, Trojánkova, Trojánek, & Farnsworth, Lloydia 35: 147. 1972; León & Alain, Fl. Cuba, imp. 2, 2: 281, fig. 121A. 1974; D. S. & H. B. Correll, Aquat. & Wetland Pl. SW. U. S., imp. 2, 2: 1396--[1398] & 1775, fig. 654 a--f. 1975; Moldenke, Biol. Abstr. 59: 6926. 1975; Moldenke, Phytologia 30: 140, 168--169, & 176 (1975), 31: 410 (1975), and 34: 250. 1976; Lakela, Long, Fleming, & Genelle, Fl. Tampa Bay, ed. 3 [Bot. Lab. Univ. S. Fla. Contrib. 73:] 116 & 182. 1976; Long & Lakela, Fl. Trop. Fla., ed. 2, 741, 742, & 961. 1976; Moldenke, Phytologia 36: 126 & 145. 1977.

Additional illustrations: León & Alain, Fl. Cuba, imp. 2, 2: 281, fig. 121A. 1974; D. S. & H. B. Correll, Aquat. & Wetland Pl. SW. U. S., imp. 2, [1398], fig. 654 a--f. 1975.

Curiously, Don (1830) places this species in his section Trifidae (with leaves trifid) even though its leaves certainly are not normally trifid. He calls it the "scabrous vervain" and says that it was introduced into English gardens from Mexico in 1825. Sweet (1830) calls it the "rough vervain" and gives its introduction date as 1822. Thomas (1969) calls it "harsh verbena" and reports that it is also known locally as "white vervain". Churchill found it growing in sloughs in Florida; Adams found it at the edges of pastures. Brumbach encountered it in disturbed ground and reports the corolla color as "lavender-purple". Other recent collectors describe the plant as having fibrous roots, stems 1--2.5 m. tall, and "corollas as long as the calyx", and have found it growing in sandy soil, marshy land, and on spoil-banks of bayous in cypress-tupelo swamps. Lakela and her associates (1976) assert that in the Tampa Bay area [Florida] it inhabits "woods, margins, glades, [and] waste places", flowering in spring and fall.

The corollas are said to have been "purple" on Curry, Martin, & Allen 449, "lavender" on C. A. Brown 3892, "pale mauve-pink with darker eye" on C. D. Adams 11408, "whitish" on C. A. Brown 4084a, and "white" on Stam 60.

Material of V. scabra has been misidentified and distributed in some herbaria as "V. polystachia H.B.K." On the other hand, the Arceneaux 383, distributed as V. scabra, actually is V. urticifolia L., while J. A. Churchill s.n. [22 August 1970] is V. urticifolia var. leiocarpa Perry & Fernald and Herb. Zuccarini s.n. [Hort. bot. Monac.] is a mixture of V. officinalis L. and xv. baileyana Moldenke.

Additional citations: FLORIDA: Collier Co.: J. A. Churchill s.n. [7 May 1969] (Ln--230044); Moldenke & Moldenke 29608 (Ac, Gz, Ld, Tu). Levy Co.: Meebold 26897 (Mu). Monroe Co.: Meebold 27567 (Mu). Sanibel Island: Brumbach 8786 (N, W--2773210). LOUISIANA: Catahoula Par.: Thomas & al. 10859 (Kl--11561). Pointe Coupee Par.: C. A. Brown 3892 (Lv). Saint James Par.: Stam 60 (Lv). Saint Tammany Par.: C. A. Brown 4084a (Lv). Tangipahoa Par.: Correll & Correll 9239 (Lv). Terrebonne Par.: Wurzlow s.n. [June 20, 1912] (Lv). West Feliciana Par.: Curry, Martin, & Allen 449 (Lv). Grand Isle: Cangemi & Andrus 80 (Lv). TEXAS: Comal Co.: Lindheimer 1077 (Mu--4090). CALIFORNIA: San Bernardino Co.: Parish & Parish 1043 (Mu--1578). JAMAICA: C. D. Adams 11408 (Mu, Mu); Wullschlägel 968 (Mu--299). HISPANIOLA: Dominican Republic: Bertero s.n. [St. Domingo] (Mu--415). PUERTO RICO: Eggers 996 (Mu--3894); Sintenis 767 (Mu--1584).

VERBENA SCABRA f. ANGUSTIFOLIA Moldenke

Additional bibliography: Moldenke, Phytologia 28: 384. 1974;
D. S. & H. B. Correll, Aquat. & Wetland Pl. SW. U. S., imp. 2,

2: 1396, 1397, & 1775. 1975.

VERBENA SCABRA var. **TERNIFOLIA** Moldenke

Additional bibliography: Moldenke, Biol. Abstr. 59: 6926. 1975; Moldenke, Phytologia 30: 169 (1975) and 31: 378. 1975.

xVERBENA SCHNACKII Moldenke

Additional bibliography: Moldenke, Phytologia 28: 384 & 457. 1974.

VERBENA SCROBICULATA Griseb.

Additional bibliography: Moldenke, Phytologia 30: 169. 1975.

The corollas on Legname & Cueszo 10450c are said to have been "purple" when fresh.

Additional citations: ARGENTINA: Jujuy: Legname & Cueszo 10450c (N).

VERBENA SEDULA Moldenke

Additional bibliography: Balgooy, Pacif. Fl. Areas 3: 245. 1975; Moldenke, Phytologia 28: 384 (1974) and 36: 236. 1977.

López-Palacios describes this species as "hierba de 0.6—1.5 m., hojas anchas, superiores relativamente estrachas, espigas largas y delgadas", the corollas on his no. 4294 as "lila", on no. 4297 as "morado lila", and on no. 4296 as "rosado morada claro", and found it in flower and fruit in February.

Additional citations: GALAPAGOS ISLANDS: Indefatigable: López-Palacios 4294 (Ld), 4296 (Ld), 4297 (Ld).

VERBENA SEDULA var. **FOURNIERI** Moldenke

Additional bibliography: Moldenke, Phytologia 24: 141. 1972.

Schimpff encountered this plant at 180 meters altitude and distributed it as V. litoralis H.B.K. Werff states that it is "a common plant in the fern-sedge zone" on Chatham island and that "the plant is somewhat spreading and the flowers are pale-blue". He found it in flower in October. His nos. 1481 & 1508 are placed here tentatively, awaiting the publication of his full study of Galápagos vervains; of no. 1481 he notes "leaves close together; flowers pale-blue, almost white".

Additional citations: GALAPAGOS ISLANDS: Chatham: Schimpff 132 (Mu); Werff 1481 (Z), 1508 (Z), 2205 [1505] (Ld).

VERBENA SELLOI Spreng.

Additional bibliography: Buek, Gen. Spec. Syn. Candoll. 3: 496. 1858; Moldenke, Phytologia 30: 152 & 169 (1975) and 36: 231. 1977.

Troncoso feels that A. santiaguensis f. albiflora Moldenke is synonymous with what she calls Glandularia pulchella var. gracilior Troncoso and which I regard as V. selloi. Araujo refers to V. selloi as a very frequent heliophilous herb with "red" flowers.

Material of V. selloi has been misidentified and distributed

in some herbaria as V. chamaedrifolia Juss.

Additional citations: BRAZIL: Rio Grande do Sul: Araujo 1312 [Herb. FKEMA 12258] (Pf); Torgo s.n. [Herb. Brad. 21258] (Mu). URUGUAY: Herter 181 [Herb. Herter 79174] (Mu).

VERBENA SESSILIS (Cham.) Kuntze

Additional bibliography: Buek, Gen. Spec. Syn. Candoll. 3: 496. 1858; Moldenke, Phytologia 28: 385 & 464 (1974), 34: 260 (1976), and 36: 237. 1977.

Pedersen refers to this plant as having weak, leaning stems, and encountered it on campos, fruiting in November. The corollas on Pedersen 7171 are said to have been "purple" when fresh.

Additional citations: PARAGUAY: Fiebrig 4031 (Mu—4441). ARGENTINA: Entre Ríos: Pedersen 7171 (N).

VERBENA SIMPLEX Lehm.

Additional & emended bibliography: Sweet, Hort. Brit., ed. 1, 1: 325. 1826; G. Don in Loud., Hort. Brit., ed. 1, 246 (1830) and ed. 2, 246. 1832; Loud., Hort. Brit., ed. 2, 552. 1832; G. Don in Loud., Hort. Brit., ed. 3, 246. 1839; Sweet, Hort. Brit., ed. 3, 553. 1839; Buek, Gen. Spec. Syn. Candoll. 3: 494—496. 1858; Co-nard, Fl. Iowa 44. 1951; R. A. Davidson, State Univ. Iowa Stud. Nat. Hist. 20 (2): 77. 1959; Cooperrider, State Univ. Iowa Stud. Nat. Hist. 20 (5): 70. 1962; Barker, Univ. Kans. Sci. Bull. 48: 571. 1969; Bolkh., Grif, Matvej., & Zakhar., Chrom. Numb. Flow. Pl., imp. 1, 716 & 717 (1969) and imp. 2, 716 & 717. 1974; E. T. Browne, Castanea 39: 183. 1974; El-Gazzar, Egypt. Journ. Bot. 17: 75 & 78. 1974; Rousseau, Géogr. Florist. Qué. [Trav. Doc. Cent. Étud. Nord 7:] 376—377, 480, 505, 643, & 788, map 827. 1974; Duncan & Foote, Wildfls. SE. U. S. 150, [151], & 295. 1975; López-Palacios, Revist. Fac. Farm. Univ. Los Andes 15: 90. 1975; Moldenke, Phytologia 30: 169—170 (1975), 31: 376 & 377 (1975), and 34: 247—249 & 279. 1976; Grimé, Bot. Black Amer. 191. 1976; Moldenke, Phytologia 36: 29, 134, 145, 221, & 244. 1977; F. H. Montgomery, Seeds & Fruits 202, fig. 1, & 230. 1977.

Additional illustrations: Duncan & Foote, Wildfls. SE. U. S. [151] (in color). 1975; F. H. Montgomery, Seeds & Fruitz 202, fig. 1. 1977.

Don (1830) calls this the "narrow-leaved vervain" and says that it was introduced into English gardens from "N. Amer." in 1802. Montgomery (1977) describes the seeds as "Nutlets as in V. bracteata, 2.5 x 0.8 x 0.6 mm." Browne (1974) records this species from Stone County, Arkansas. Churchill found it growing on road embankments; Harold encountered it in grassy woodlands. Demaree records it as "common on clay banks" at 275 feet altitude in Arkansas. Cooperrider (1962) found it to be frequent in low sandy ground along rivers in Clinton and Jones Counties, Iowa, while Davidson (1959) refers to it as infrequent in dry sandy soil in Louisa and Muscatine Counties in the same state. Barker (1969) records it from Butler, Chase, Cowley, Lyon, and

Wabaunsee Counties in Kansas, where, he says, it is "Occasional in rocky upland prairie, on rocky prairie slopes, [and] along roadsides and right-of-ways".

Muehlenbach considered his no. 1525 to represent a natural hybrid of this species with V. bracteata Lag. & Rodr., but I see no evidence of this supposed hybridity. I regard his collection as merely representing the edaphically erect form of V. bracteata.

The corollas on F. R. Fosberg 35716 are said to have been "blue-lavender" when fresh.

Material of V. simplex has been misidentified and distributed in some herbaria as V. carolina L. The Curtiss 1955 collection is a mixture with var. eggerti Moldenke. The Gattinger s.n. [Nashville, June-August] and Tans 1360, distributed as typical V. simplex, are better regarded as var. eggerti, while V. Keller s.n. [Aug. 24, 1917] is V. halei Small and J. A. Churchill s.n. [25 May 1954] is V. stricta Vent.

Additional citations: NEW YORK: County undetermined: Schoepf s.n. [Ad New York] (Mu--249). NEW JERSEY: Atlantic Co.: J. A. Churchill s.n. [19 June 1957] (Ln--230284). County undetermined: Hillebrand s.n. (Mu); Herb. Zuccarini s.n. (Mu--254). VIRGINIA: Fauquier Co.: F. R. Fosberg 35916 (N). ILLINOIS: Will Co.: Meebold 19175 (Mu). Winnebago Co.: Bebb s.n. [Fountaindale] (Mu). INDIANA: Jefferson Co.: Frazer s.n. [June 30, 1885] (Lc). KENTUCKY: County undetermined: Herb. Kummer s.n. (Mu--1241). TENNESSEE: Blount Co.: Curtiss 1955, in part (Mu--1278). Morgan Co.: J. A. Churchill s.n. [8 May 1955] (Ln--204158). KANSAS: Lyon Co.: Harold s.n. [6/22/60] (Lc). Miami Co.: Hauser & Brooks 2887 (N, N). MISSOURI: Cass Co.: Meebold 24221 (Mu). Dent. Co.: Meebold 25368 (Mu). Jackson Co.: Meebold 25199 (Mu), 26766 (Mu). Ripley Co.: Morizot & Whatley s.n. [30 June 1968] (Kl--11866). Saint Louis: Muehlenbeck 1208 (Mu). ARKANSAS: Izard Co.: R. D. Thomas 15366 (Kl--11812). Randolph Co.: Demaree 69646 (Ld). UNITED STATES: State undetermined: Hooker s.n. [S. States] (Mu--253). NORTH AMERICA: Locality undetermined: Harz s.n. [N. Am.] (Mu). CULTIVATED: Germany: Herb. Mus. Bot. Landishuth s.n. (Mu--248); Herb. Schwaegrichen s.n. [Hort. Lipsiensis] (Mu--1260), s. n. (Mu--1247); Herb. Zuccarini s.n. [H. b. M. 1819] (Mu--251), s.n. [Hort. bot. Monac. 1830] (Mu--252).

VERBENA SIMPLEX var. EGGERTI Moldenke

Additional synonymy: Verbena multicaulis Raf., Herb. Raf. 65, nom. nud. 1833.

Additional & emended bibliography: Raf., Herb. Raf. 65. 1833; E. D. Merr., Ind. Raf. 205 & 295. 1944; Moldenke, Résumé Suppl. 7: 2, 3, & 10. 1963; Moldenke, Phytologia 11: 473 & 480. 1965; Moldenke, Fifth Summ. 1: 18, 38, 44, 46, & 66 (1971) and 2: 695,

793, 917, & 920. 1971; Moldenke, Phytologia 23: 373 (1972), 24: 147 (1972), 34: 248, 249, & 279 (1976), and 36: 244. 1977.

Tans encountered this variety in roadside gravel on a sunny moraine ridge, growing with Ambrosia psilostachya, Andropogon gerardi, Asclepias verticillata, Carduus nutans, Euphorbia corollata, Desmodium canadense, and D. illinoense, and describes the corollas as light-blue.

Curtiss 1955 is a mixture of this variety and typical V. simplex Lehm. Material of the variety has been found growing along roadsides and has generally been distributed in herbaria as V. angustifolia Michx.

Additional citations: TENNESSEE: Blount Co.: Curtiss 1955, in part (Mu-1278). Davidson Co.: Gattinger s.n. [Nashville, June-Aug.] (Mu). WISCONSIN: Walworth Co.: Tans 1360 (Ts).

VERBENA SPECTABILIS Moldenke

Additional bibliography: Moldenke, Phytologia 24: 147 (1972) and 34: 259 & 260. 1976.

The corollas on Porto & Oliveira ICN.9586 are described as having been "vermelhas 5R2/12", while those on Rodriguez 530 were "violet". The latter collection was in flower in August and has previously been incorrectly cited by me as V. phlogiflora Cham.

Additional citations: BRAZIL: Rio Grande do Sul: Porto & Oliveira ICN.9586 (Ut-320461). ARGENTINA: Misiones: D. Rodriguez 530 [Herb. Inst. Miguel Lillo 31561] (N).

VERBENA SPHAEROCARPA Perry

Additional bibliography: Moldenke, Phytologia 28: 387. 1974.

Felger encountered this plant on sunny slopes and the slopes of volcanic cones, at 600-1000 meters altitude, flowering and fruiting in March. The corollas are said to have been "bluish" on his no. 15758 and "lavender" on no. 15822.

Additional citations: MEXICAN OCEANIC ISLANDS: Socorro: Felger 15758 (Sd-83127), 15822 (Sd-83196).

VERBENA STACHYS Raimondi

Additional bibliography: Moldenke, Phytologia 24: 147-148. 1972; Soukup, Biota 11: 19. 1976.

VERBENA STELLARIOIDES Cham.

Additional & emended synonymy: Verbena stellaroides α decurrens Cham. ex Schau. in A. DC., Prodr. 11: 541. 1847. Glandularia stellatioides (Cham.) Covas & Schnack ex Bolkh., Grif, Matvej., & Zakhar., Chrom. Numb. Flow. Pl., imp. 1, 715, sphalm. 1969.

Additional & emended bibliography: Buek, Gen. Spec. Syn. Candoll. 3: 496. 1858; Bolkh., Grif, Matvej., & Zakhar., Chrom. Numb. Flow. Pl., imp. 1, 715 (1969) and imp. 2, 715. 1974; Moldenke, Phytologia 28: 368, 387, 457, & 464 (1974) and 36: 48 & 153. 1977.

The Flebrig 4031, distributed as V. stellaroides, seems better regarded as representing V. sessilis (Cham.) Kuntze, a very closely related taxon.

VERBENA STEWARTII Moldenke

Additional bibliography: Moldenke, *Phytologia* 24: 148--149. 1972; Balgooy, *Pacif. Pl. Areas* 3: 245. 1975; Moldenke, *Phytologia* 36: 33. 1977; Van der Werff, *Bot. Notiser* 130: 96--97. 1977.

López-Palacios describes this plant as "hierba de hojas y espigas delgadas, fl. morado claro" and found it in flower and fruit in February.

Van der Werff (1977) is of the opinion that this taxon is conspecific with a very variable V. townsendii Svenson.

Additional citations: GALAPAGOS ISLANDS: Narborough: López-Palacios 4300 (Z).

VERBENA STOREOCLADA Briq.

Additional bibliography: Moldenke, *Phytologia* 28: 388 & 465. 1974.

VERBENA STRICTA Vent.

Additional & emended bibliography: Sweet, *Hort. Brit.*, ed. 1, 1: 325. 1826; G. Don in Loud., *Hort. Brit.*, ed. 1, 246 (1830) and ed. 2, 246, 1832; Loud., *Hort. Brit.*, ed. 2, 552. 1832; G. Don in Loud., *Hort. Brit.*, ed. 3, 246. 1839; Sweet, *Hort. Brit.*, ed. 3, 553. 1839; Buek, *Gen. Spec. Syn. Candoll.* 3: 494--496. 1858; Kuntze, *Rev. Gen. Pl.* 2: 510. 1891; Conard, *Pl. Iowa* 44. 1951; E. R. Spencer, *Just Weeds*, ed. 2, 201--204 & 332, fig. 65. 1957; R. A. Davidson, *State Univ. Iowa Stud. Nat. Hist.* 20 (2): 77. 1959; Hall & Thompson, *Cranbrook Inst. Sci. Bull.* 39: 74. 1959; Cooper-riding, *State Univ. Iowa Stud. Nat. Hist.* 20 (5): 70. 1962; P. W. Thompson, *Cranbrook Inst. Sci. Bull.* 52: 37. 1967; Barker, *Univ. Kans. Sci. Bull.* 48: 571. 1969; E. R. Spencer, *All About Weeds* 201--204 & 332, fig. 65. 1968; Bolkh., Grif, Matvej., & Zakhar., *Chrom. Numb. Flow. Pl.*, imp. 1, 717. 1969; G. W. Thomas, *Tex. Pl. Ecol. Summ.* 78. 1969; Scully, *Treas. Am. Ind. Herbs* 283. 1970; Bolkh., Grif, Matvej., & Zakhar., *Chrom. Numb. Flow. Pl.*, imp. 2, 717. 1974; El-Gazzar, *Egypt. Journ. Bot.* 17: 75 & 78. 1974; Rousseau, *Géogr. Florist. Qué.* [Trav. Doc. Cent. Étud. Nord 7:] 377, 465, 643, & 785, map 828. 1974; [Bard], *Bull. Torrey Bot. Club* 102: 431. 1975; Perkins, Estes, & Thorp, *Bull. Torrey Bot. Club* 102: 194--198. 1975; Moldenke, *Phytologia* 30: 170 (1975), 31: 415 (1975), and 34: 249 & 279. 1976; Anon., *Biol. Abstr.* 61: ACL.732. 1976; Grisé, *Bot. Black Amer.* 191. 1976; Van Bruggen, *Vasc. Pl. S. Dak.* 369, 520, & 536. 1976; Ziegler & Sohmer, *Contrib. Herb. Univ. Wisc. LaCrosse* 13: 16. 1976; Moldenke, *Phytologia* 36: 29, 135, 150, 157, 217, 224, & 229. 1977; F. H. Montgomery, *Seeds & Fruits* 202, fig. 2, & 230. 1977.

Additional illustrations: E. R. Spencer, *Just Weeds*, ed. 2, [203], fig. 65. 1957; E. R. Spencer, *All About Weeds* [203], fig.

65. 1968; F. H. Montgomery, Seeds & Fruits 202, fig. 2. 1977.

Don (1830) calls this species the "strict vervain" and says that it was introduced into English gardens from North America in 1802. Sweet (1826) calls it the "upright vervain". Thomas (1969) lists the name "mullenleaf verbain" (sic).

Churchill has found this species growing in dry open fields, on dry sandy knolls, and in gravelly disturbed soil around gravel pits in Michigan. Stephens & Brooks refer to it as "abundant with f. albiflora in dry, sandy, rocky, clay soil on prairie pasture hillsides. Montgomery (1977) describes the seeds as "Nutlets 2.8 x 0.7 x 0.6 mm., form as in V. bracteata, most of the dorsal surface coarsely reticulate, inner surfaces with a white pubescence or papillose".

Scully (1970) lists some Amerind uses for this plant, for which see under V. hastata L. in the present series of notes.

Perkins and his associates (1975) have studied "an association of V. stricta, V. bracteata Lag. & Rodr., V. halei Small, V. urticifolia L., and derived interspecific hybrids in southern Oklahoma. All hybrids but one involved V. stricta parentage. Of the four species, V. stricta produces the largest and most aggregated blossoms, the most accessible pollen, and the greatest quantity of nectar. The species is visited by the broadest spectrum of insects, including the following: Coleoptera: Anomala sp., Diptera: Atomosia melanopogon, Bacca sp. (with Verbena pollen on head), Exoprosopa sp. (with pollen on head), Neorhynchocephalus sp. (with pollen on head), Systropus sp. (with pollen on head), Homoptera: Cuerna sp., Hymenoptera: Apis mellifera (with pollen on head), Stictiella formosa, Bombus americanorum (with pollen on head), Ceratina shinersi (with pollen on head), Dialictus sp. (with pollen on head), Megachile spp. (with pollen on head), Svastra atripes, Tripeolus sp., Xylocopa virginica, and Lepidoptera: Agraulis vanillae, Atalopedes campestris, Danaus plexippus, Euphytes vestris, Eurema lisa, E. mexicana, Grais stigmaticus, Hemiargus isola, Hylephila phyleus, Leptotes marina, Pieris protodice, Pholisora cattulus, Strymon melinus, Thorabes bathyllus, T. phylades, Vanessa virginiensis. Nine of these insects were also found visiting each of the other 3 species. Insect exclusion and artificial pollination experiments indicated that V. stricta is an outcrossing species with low seed-set through self-fertilization; V. halei and V. urticifolia are highly autogamous and V. bracteata less so. The likelihood that V. stricta will enter into interspecific hybridization is greater than that for the other 3 species. Number, frequency, and pollen-carrying ability of the interspecific pollen vectors favor crosses with V. stricta involving V. urticifolia and V. halei."

These authors note that V. stricta "occupies disturbed sites throughout the Central United States. In southern Oklahoma, it occurs within the ranges of V. bracteata.....V. halei..... and V.

urticifolia....and hybrids frequently occur where the species are sympatric...All four species and a series of putative hybrids were found growing, almost to the exclusion of other species, on a highly disturbed area, a hog lot....Approximately 500--700 plants of V. halei and V. bracteata were present in the study area. Verbena stricta and V. urticifolia were represented by only 50--60 individuals. Pure stands of V. stricta, V. urticifolia, and V. bracteata occurred within the larger area, but in many sections at least three of the species, and at times all four, were located within a 5 m. radius. All but one of the hybrids exhibited morphological affinities with V. stricta."

They found that 5 male fertile insect-visited plants of V. stricta with 623 potential seeds had an 87.6 percent seed-set, 5 male sterile insect-visited plants with 747 potential seeds had 76.3 percent seed-set. Nine bagged plants yielded 1263 seeds and a 7.5 percent seed-set; 3 geitonogamous artificially cross-pollinated plants yielded 695 seeds and a 14.3 percent seed-set, and 2 xenogamous artificially cross-pollinated plants yielded 433 seeds and a 78.5 percentage seed-set.

"All four species have two sterile styler lobes, one or occasionally both of which extend as elongate lobes beyond the glandular stigmatic surface. Stigmatic receptivity appears to develop first near these lobes and then to spread across the stigmatic zone. Quantities of pollen were found in the axils of the lobes, which may function as passive scrapers of pollen off the mouthparts of probing insects. In Verbena stricta dehiscence commences the day before unfolding of the corolla lobes and continues until the corolla falls away, a total of three days. Thus, self-pollination could occur prior to exposure of the stigma; however, autodeposition of pollen is unlikely: The anthers are borne ca 2 mm above the stigma, and the pollen remains at this level. The corolla tube is inclined so that the distal third of the tube which contains the anthers is nearly horizontal. Hairs in the corolla also restrict the free fall of pollen to the stigma. Additionally, the stigma is not receptive until the flower has opened. Pollen was not observed on the stigma of bagged flowers. Spatial separation of the anthers and stigma in the other three species is less than in Verbena stricta."

They report the corolla color in V. stricta to be light-purple and the corolla 9 mm. in diameter -- the other species have less showy and smaller flowers with the corolla-tube straight (in V. stricta it is strongly curved below the anther level).

"Of the four species, Verbena stricta is probably the most attractive to insects. It is perhaps the tallest plant of the group (mostly over 100 cm) and has 4--21 upright flowering branches bearing dense aggregates of flowers....The nectar...contains 38±2 percent dissolved solids. Assuming these solids to be sugars, this percentage is approximately at the mid-range of a series of sugar concentrations of nectar for 43 species of flowering plants reported by Percival (1961). Although nectar exists in the

other three species, the amount was too slight for extraction.

"Several characteristics.....of the inflorescences and flowers of Verbena stricta indicate its probable attractiveness for a variety of anthophilous insects: (1) several dense, elongate spikes, each with a mass of light purple flowers forming a showy unit; (2) tubular corolla with a horizontal throat; (3) protected nectar source with a relatively high percentage of dissolved solids and the nectar sources massed.....; (4) a landing platform; and (5) a supply of easily accessible pollen at the throat of each corolla tube.....Verbena stricta was visited by the greatest diversity and number of potential pollinators.....

"All insect visitors appeared to probe the flowers of Verbena stricta for nectar with the exception of a small solitary bee (not captured), which gathered pollen only. The butterflies methodically probed several flowers on each dense branch and then flew to another branch on the same plant or an adjacent plant. Longer flights were infrequent. Foraging patterns of flies resembled those of butterflies, but the flies spent less time probing each flower and moved more rapidly from plant to plant. Bees tended to visit fewer flowers on each plant and to forage over greater distances, especially those which were gathering pollen.

"Most individual visitors were typically species specific. The only insect observed visiting indiscriminately both parental plants and their hybrid (V. stricta, V. urticifolia, and V. x deamii) was Systropus. A single Hemiargus isola was observed to visit V. bracteata and V. stricta successively....visitors to Verbena stricta and V. halei were fairly equally divided among the three major orders of specialized insect pollinators, Diptera, Hymenoptera, and Lepidoptera....it is obvious that pollen from the other three species is viable on the stigmas of Verbena stricta, but that interspecific crosses may produce fewer seeds than intraspecific, allogamous crosses.....Nevertheless, cross-pollination among these species involving V. stricta as the carpellate parent is likely and cross-fertilization feasible."

They point out that V. stricta sets significantly fewer seeds when bagged than when open-pollinated. "Although V. stricta and V. bracteata are capable of autogamous reproduction, each shows a tendency for cross-fertilization. This tendency is most pronounced in V. stricta. Artificial pollen transfer within a single plant of V. stricta also demonstrates considerably lower seed set. This species, then, is partially self-incompatible.

"Pollen fertility in Verbena stricta varies considerably with complete sterility evidence in 3 plants, about 14 percent fertility in 4 plants, under 50 percent in 8 other plants, and the remaining 17 plants sampled exhibiting 63—98.3 percent fertility. The 15 plants of V. stricta which exhibited less than 50 percent fertility also had indehiscent anthers. Yet even in the 3 completely sterile individuals seed set was 76 percent. A bagged, pollen sterile plant set no seed while bagged, but set full seed

when exposed to pollinators. Seed set in pollen-sterile individuals approaches normalcy, and therefore such plants are ovule-fertile....pollen-sterile plants set seed only when pollen-fertile forms grow in close proximity and pollinators are readily available. Although the majority of the plants of V. stricta are capable of either outcrossing or selfing, a limited number in this locality function only as pistillate parents.

"On the basis of its reproductive biology and pollination system, Verbena stricta seems more likely to enter into interspecific hybridization than the other three species...for the following reasons: (1) V. stricta is primarily allogamous, whereas in V. halei and V. urticifolia, approximately 50 percent of the gametes are committed to autogamy; (2) V. stricta shares taxa of pollinators with each of the other three species; (3) pollen washings also indicate that interspecific crosses should occur most frequently among the triad V. stricta, V. halei and V. urticifolia. Visitors shared among V. stricta, V. halei and V. urticifolia were primarily bees and flies. The most common visitors shared by V. stricta and V. urticifolia were butterflies, which may be less dependable pollinators.

"Only one hybrid plant of V. stricta x V. bracteata parentage was found. The two outcrossing species are the least likely to hybridize. The hybrids most frequently found involved Verbena stricta as one of the parental species. Interspecific cross-pollinations, therefore, appear to be skewed in favor of V. stricta, the most attractive to the greatest number and variety of insects. In conditions where the four species are sympatric, hybrids would be expected to include V. stricta as one of the parental types, with crosses involving V. halei and V. urticifolia the most likely to occur and V. bracteata the least likely to do so."

These workers have done a tremendously important piece of research and deserve the highest praise! Many more such studies are urgently needed in this genus (and in other genera of this family) to help us to understand the taxonomic and systematic position of the many groups of puzzlingly variable or puzzlingly similar taxa.

Hall & Thompson (1959) record V. stricta from Oakland County, Michigan, where they say it is occasional in fields, especially in sandy soil; Thompson (1967) lists it for Leelanau County. In Iowa Davidson (1959) records it as a common "Weed of roadsides, railways, pastures, and other open, often sandy, places", while Cooperrider (1962) also refers to it as common in sandy roadsides and other open sandy places in that state. In Kansas Barrell notes that it is "Common, in upland prairies, on prairie slopes, along roadsides and railroad right-of-ways. Occurs throughout the area." Barber also found it "occasional in grassy lightly grazed uplands with Chrysopsis villosa" in Kansas.

Grimé (1976) says "Vervain [is] a cure for rheumatism. The following notes from Cameron Mann, a well known botanist of Kansas

City, are worth recording: 'The following remedy for rheumatism was recently communicated to me by a respectable lady, who had found it quite successful in her own case, and also with several of her friends. It was given her by an old negress who claimed many years ago to have been told of it by an Indian. The medicine is made by boiling the root and part of the stalk of one of the blue vervains in vinegar for twelve hours, and then rubbing the decoction upon the afflicted parts. Which of the species was used I could not tell from the species [specimens] shown me, as they consisted merely of root and stalk, with, fortunately one stalk bearing withered flowers. The latter identified the plant as a Verbena, but there being no leaves, I could not tell whether it was Verbena angustifolia, Verbena hastata, Verbena stricta, [or] Verbena bracteosa, all four being native here."

The Herb. Zuccarini s.n. [Hort. bot. Monac.] collection, cited below, is a mixture with V. moechina Moldenke.

Material of V. stricta has been misidentified and distributed in some herbaria as V. bracteosa Michx. and as V. simplex Lehm. On the other hand, the Bynum, Ingram, & Jaynes s.n. [Apr. 13, 1933], distributed as V. stricta, actually is V. rigida Spreng.

Additional citations: NEW YORK: Suffolk Co.: Kandler s.n. [Upton, 5.8.1956] (Mu). ILLINOIS: Adams Co.: Purpus 117 (Mu—4289). Winnebago Co.: Bebb s.n. [Fountaindale] (Mu—4252). County undetermined: Herb. Zuccarini s.n. (Mu—373). INDIANA: Tippecanoe Co.: Bresinsky s.n. [2.7.1967] (Mu). IOWA: County undetermined: Hillebrand s.n. [Iowa, 1871] (Mu). MICHIGAN: Antrim Co.: T. H. P. Marshall 1738 (Ln—127640). Macomb Co.: J. A. Churchill s.n. [18 July 1954] (Ln—204161). Oakland Co.: J. A. Churchill s.n. [25 May 1954] (Ln—203432). WISCONSIN: La Crosse Co.: Doppelbaur & Doppelbaur 963 (Mu). MINNESOTA: Clay Co.: O. A. Stevens 1271 (Mi). SOUTH DAKOTA: Lawrence Co.: N. F. Petersen s.n. [Spearfish] (Lv). Pennington Co.: O. M. Clark 6044 (Mu). Stanley Co.: Stephens & Brooks 33954 (Sd—74497). KANSAS: Barber Co.: Barrell 38-72 (W—2802774). Lyon Co.: Hauser & Brooks 3058 (N); F. L. Nelson s.n. [June 29, 1960] (Lc); A. V. Weber s.n. [June 28, 1959] (Lv). MISSOURI: Cass Co.: Meebold 24220 (Mu). Cole Co.: Meebold 25461 (Mu). Ralls Co.: J. Davis 4488 (Mu). Saint Louis: Engelmann s.n. [St. Louis] (Mu); Mühlenbeck 145 (Mu, Mu). County undetermined: Martens s.n. (Mu—574). ARKANSAS: IZARD Co.: R. D. Thomas 15346 (K1—11810). Phillips Co.: Demaree 15224 (Lv). NEBRASKA: Pierce Co.: N. F. Petersen s.n. [Aug. 11, 1910] (Lv). CULTIVATED: France: Herb. Schreber s.n. [Ex horto Parisii] (Mu—370). Germany: Herb. Schreber s.n. [Hortus Erlangensis 1805] (Mu—371); Herb. Zuccarini s.n. [Hort. bot. Monac.] (Mu—375, Mu—376).

VERBENA STRIGOSA Cham.

Additional bibliography: Buek, Gen. Spec. Syn. Candoll. 3: 496.

1858; Moldenke, *Phytologia* 30: 170 (1975) and 36: 226. 1977.

Recent collectors describe this plant as a decumbent herb, 50 cm. tall, found it growing along roadsides, and report that the flowers "attract many bees". They have found it in flower in September and both in flower and fruit in December.

The corollas on Lindeman & Haas 2475 are described as having been "blue-purple (10PB6/6)", while on Lourteig 2143 they were "lilac". Handro says of the plant "planta do campo, formando grandes touceiras; flores roxo-azuis".

The Reitz & Klein 17616, cited below, was previously erroneously cited by me as *V. hirta* var. *gracilis* Dusén. The Dusén 242, distributed as *V. strigosa*, actually is *V. lobata* Vell.

Additional citations: BRAZIL: Paraná: Hatschbach 4216 (Mu); Lindeman & Haas 2475 (Id); Reitz & Klein 17616 (Ac, N, W-2548333). Santa Catarina: Lourteig 2143 (N). São Paulo: Handro 607 [Herb. Inst. Bot. S. Paulo 55438] (W-2748270).

VERBENA SULPHUREA D. Don

Additional synonymy: *Glandularia sulphurea* D. Don ex Spach, *Hist. Nat. Veg. Phan.* 9: 241. 1840. *Verbena diceris* Bert. ex Moldenke, *Phytologia* 36: 48, in syn. 1977.

Additional & amended bibliography: G. Don in Loud., *Hort. Brit. Suppl.* 1: 680. 1832; Loud., *Hort. Brit.*, ed. 2, 553. 1832; Baxt. in Loud., *Hort. Brit. Suppl.* 2: 680. 1839; Sweet, *Hort. Brit.*, ed. 3, 553. 1839; Spach, *Hist. Nat. Veg. Phan.* 9: 241. 1840; Baxt. in Loud., *Hort. Brit. Suppl.* [3]: 655. 1850; Buek, *Gen. Spec. Syn. Candoll.* 3: 494 & 496. 1858; Bolkh., *Grif, Matvej., & Zakhar.*, *Chrom. Numb. Flow. Pl.*, imp. 1, 717 (1969) and imp. 2, 717. 1974; Moldenke & Neff, *Orig. & Struct. Ecosyst. Techn. Rep.* 74-18: 57, 75, 116, & 118. 1974; Moldenke, *Phytologia* 30: 171 (1975), 34: 274 (1976), and 36: 40 & 48. 1977.

Spach (1840) calls this species the "*glandularia jaune*", while Loudon (1832) calls it the "sulphur-coloured vervain" and says that it was introduced into English gardens from Chile in 1834.

Additional citations: CHILE: Aconcagua: Deesauer s.n. [Aconcagua '97] (Mu). Coquimbo: Grau & Grau 1663 (Mu). Valparaíso: Behn s.n. [16 Oktobr. 1929] (Mu); Bertero 1392 (Mu-377), 1809 (Mu-377); Buchtien s.n. [21.IX.1895] (Mu-1839). Province undetermined: Deesauer s.n. [Fishermans] (Mu); Frömbing s.n. [1886] (Mu-1787). CULTIVATED: Germany: Herb. Kummer s.n. [Hort. bot. Monac. 1846] (Mu-1268).

VERBENA SULPHUREA var. FUSCORUBRA Skottsberg

Additional bibliography: Moldenke & Neff, *Orig. & Struct. Ecosyst. Techn. Rep.* 74-18: 118. 1974; Moldenke, *Phytologia* 24: 227. 1972.

[to be continued]